

**Nurses' knowledge of intensive care unit on central venous catheter dressing**

*Conhecimentos dos enfermeiros de unidade de terapia intensiva sobre curativo de cateter venoso central*

*Conocimientos de los enfermeros de unidad de terapia intensiva sobre curativo de catéter venoso central*

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**ABSTRACT**

**Objective:** to describe the knowledge of the nurses of an Intensive Care Unit on the dressing of Central Venous Catheter. **Method:** descriptive, exploratory research with quantitative approach, performed with nurses in an Intensive Care Unit. A closed questionnaire was used with questions about Central Venous Catheter dressing and for documentary analysis of the patients submitted to the procedure. Data collection took place in the period from February to April 2016. The study follows all ethical and legal precepts, being approved with nº53479016.4.0000.5541. **Results:** Participants (100%) were right regarding hand hygiene and protection barriers; while 50% were correct in relation to the puncture site and the first dressing with gauze and micropore; 50% were correct regarding the clear membrane dressing. **Conclusion:** nurses have satisfactory knowledge about the dressing of central venous catheter, however, there is a need for capacity building and greater adherence in relation to nursing prescriptions.

**Descriptors:** Catheters, indwelling; Nurses; Intensive Care Units; Catheter-Related Infections.

**RESUMO**

**Objetivo:** descrever o conhecimento dos enfermeiros de uma Unidade de Terapia Intensiva sobre o curativo de Cateter venoso central. **Método:** pesquisa descritiva, exploratória com abordagem quantitativa, realizada com enfermeiros em uma Unidade de Terapia Intensiva. Utilizou-se questionário fechado com questões sobre curativo de Cateter Venoso Central e para análise documental prontuários dos pacientes submetidos ao procedimento. A coleta de dados ocorreu no período de fevereiro a abril de 2016. O estudo segue todos os preceitos éticos e legais, sendo aprovado com o nº53479016.4.0000.5541. **Resultado:** Os participantes (100%) acertaram em relação a higienização das mãos e barreiras de proteção; enquanto 50% acertaram em relação ao local da punção e primeiro curativo com gaze e micropore; 50% acertaram em relação ao curativo com membrana transparente. **Conclusão:** os enfermeiros possuem conhecimento satisfatório sobre o curativo de Cateter venoso central, contudo, existe necessidade de capacitação e maior adesão em relação às prescrições de enfermagem.

**Descritores:** Cateteres de demora; Enfermeiros; Unidades de Terapia Intensiva; Infecções Relacionadas a Cateter.

**RESUMÉN**

**Objetivo:** describir el conocimiento de los enfermeros de una Unidad de Terapia Intensiva sobre el curativo de Cateter venoso central. **Método:** investigación descriptiva, exploratoria con abordaje cuantitativo, realizada con enfermeros en una Unidad de Terapia Intensiva. Se utilizó un cuestionario cerrado con preguntas sobre curativo de Cateter Venoso Central y para análisis documental prontuarios de los pacientes sometidos al procedimiento. La recolección de datos ocurrió en el período de febrero a abril de 2016. El estudio sigue todos los preceptos éticos y legales, siendo aprobado con el nº53479016.4.0000.5541. **Resultado:** Los participantes (100%) acertaron en relación a la higienización de las manos y barreras de protección; mientras que el 50% acertado en relación al local de la punción y primer vendaje con gasa y micropore; El 50% acertado en relación al vendaje con membrana transparente. **Conclusión:** los enfermeros poseen conocimiento satisfactorio sobre el curativo de Cateter venoso central, sin embargo, existe necesidad de capacitación y mayor adhesión en relación a las prescripciones de enfermería.

**Descriptoros:** Catéteres de demora; enfermeras; Unidades de Terapia Intensiva; Infecciones Relacionadas a Cateter.

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## INTRODUCTION

Intensive Care Units (ICUs) are specialized places and are intended to treat patients whose survival is threatened by pathologies or conditions that destabilize the functioning of body systems. Thus, the monitoring of patients who are hospitalized in ICUs is essential and often indispensable so many devices are used in this environment, highlighting the intravascular catheters, especially Central Venous Catheters (CVC), it is estimated that about 48% of patients make use of the central access.<sup>1-2</sup>

The CVC is comprised of the insertion of a catheter into a large caliber vessel giving access to the central circulation. They are indicated for several situations, namely: infusion of vasoactive medications, rapid replacement of fluids and electrolytes, transfusions, parenteral diet and blood collection.<sup>3</sup>

The Central Venous Catheterization process involves several health professionals (physicians, nurses and nursing technicians), who should prioritize the safety of these patients through the implementation of care protocols, good health practices that provide good results, quality indicators, the prevention of possible complications resulting from the procedure and the evaluation of the results obtained after the intervention.<sup>2-4</sup>

The nurse has the preponderant role in monitoring patient safety using the CVC, in its evaluation and maintenance, thus, it is required that this professional provides quality care to the patient using the catheter, to ensure its correct functioning and to avoid the occurrence of possible complications.<sup>5</sup>

One of the main functions of the nurse is during the maintenance of the catheter, in order to avoid the development of infection in the bloodstream associated to the use of the device.<sup>6</sup>

Primary CVC-related infections in the bloodstream are associated with increased morbidity and mortality in patients, as well as increasing hospital costs and reducing quality indicators. An effective action to prevent adequate cleaning IPCS is at the insertion site and surrounding skin, in addition to performing the dressing properly; the insertion of the catheter should have a good coverage, preferably transparent allowing visualization of the insertion, it is recommended with chlorhexidine decreasing the chances of infection, since it reduces the microbial activity.<sup>7-8</sup>

Alguns curativos foram desenvolvidos para reduzir as chances de infecção, por exemplo os que apresentam gel de clorexidina, que é constantemente liberada no local do curativo, este tipo de curativo deve ser trocado a cada sete dias ou antes se apresentar sujidade, umidade ou deslocamento.<sup>7</sup>

The correct maintenance of the CVC dressings is able to reduce the incidence of associated infections, it is understood that this assignment is of the nursing, which must understand the importance of the care of the insertion, maintenance and removal of the device.<sup>7</sup>

Nursing care performed at ICUs is challenging and complex, these professionals are submitted to situations of various severities, requiring more attention and control, and the

need for constant implementation of new technologies that provide safer and more humane care, besides it there is the need to increase the knowledge of these professionals regarding the use of CVCs.<sup>1</sup>

Because it is a highly complex procedure, catheter insertion, the responsibility of patient care with CVC involves the entire team and demonstrates the need to create, implement and comply with care protocols, which aim to provide quality surveillance and that promote the prevention and control of infections related to health care.<sup>4</sup>

Health care-related infections (HAIs) are considered to be a major challenge, since the morbidity and mortality rates related to them are high, especially in the ICUs, the sector with the highest incidence. Approximately 60% of infections are associated with the use of invasive devices, with CVCs being one of the main causes and becoming the responsibility of the nurse professional and his properly trained staff to prevent and control IRAS.<sup>4-5</sup>

Therefore, the objective of the present research is to describe the nurses' knowledge about the dressing of Central Venous Catheter in an Intensive Care Unit and to analyze the medical records of the patients submitted to this procedure in order to identify the nursing prescriptions.

## METHODS

This is a descriptive, exploratory, with a quantitative approach, carried out with nurses working in an Intensive Care Unit from February

to April 2016, both with interview and with documentary analysis of medical records.

The sample universe was composed of 05 nurses who worked in a UTI. They were selected after application of the inclusion/exclusion criteria, namely: Nurses working in the ICU object of this study for at least 1 year. And exclusion criteria: nurses who are not present at the time of application of the questionnaire for vacations, rest (or other reason).

Subsequently a documentary analysis was performed, the inclusion and exclusion criteria were also established, including: medical records of patients submitted to the procedure; retrospective records for 1 year; charts of both sexes and all ages; medical records were excluded from patients who were already hospitalized with the implanted catheter.

Data collection was performed by the researcher and was done through the application of a questionnaire elaborated by the authors, based on the literature on the subject, containing closed questions for the nurses employees of the ICU object of this study regarding the knowledge about the CVC dressing, in addition to socio demographic data, the questions were applied at the Intensive Care Unit of Juína - MT, after receiving approval from the Ethics Committee of the Júlio Muller University Hospital, under protocol: 53479016.4.0000.5541, on the date of April 10, 2016.

Subsequently, a retrospective and random analysis of 505 portfolios of individuals of both sexes, both adults and children, who were attended at a study ICU during the period from

December 2014 to December 2015, totaled a final sample of 81 of patients who underwent the CVC procedure. After this categorization, an analysis was made of how many nurses performed the prescription of the CVC dressing. Data were collected from: place of catheter insertion; sex of the patient; time of permanence and evolution (withdrawal, end of therapy or death).

The data obtained were presented in Microsoft Office Excel spreadsheets, analyzed, quantified and later presented in tables and graphs forms. We analyzed data from the questionnaire about nurses' knowledge about CVC containing questions about CVC dressing.

## RESULTS

Of the 05 nurses who are part of the ICU team of this study, 01 were absent at the time of application (vacation, rest or other reason) according to the exclusion criteria, with a final sample of 04 nurses.

Table 01 shows the representation of the answers given by the nurses about the care techniques related to the CVCs, being specified as correct or incorrect answers according to what is recommended by ANVISA.

**Table 01:** Questions related to the Central Venous Catheter care technique applied to nurses, n = 04, Mato Grosso, 2016.

Description	Rights		Errors		Total	
	N	%	N	%	N	%
When should hand hygiene take place?	04	100%	0	0	04	100%
What are the maximum barriers to protection?	04	100%	0	0	04	100%
Where is the most appropriate place for puncture?	02	50%	02	50%	04	100%
When should the first exchange of CVC post-passage dressing be performed?	04	100%	0	0	04	100%
When should the dressing be performed at the insertion site with gauze and Micropore?	02	50%	02	50%	04	100%
When should the dressing be performed at the insertion site with semipermeable clear membrane?	02	50%	02	50%	04	100%

Subsequently, in the retrospective and random analysis of 505 medical records of

individuals of both sexes, both adults and children, who were attended at the ICU under

study, during the period from December 2014 to December 2015, a total sample of 81 medical records patients who underwent the CVC procedure. After this categorization, an analysis

of how much: insertion site; reasons for insertion; length of stay and reasons for withdrawal, set out in table 02 below.

**Table 02:** Characterization of the medical records of the patients who received CVC, n=81=100%. Mato Grosso, 2016.

Medical records analysis				
Insertion place	Right jugular	Left jugular	Righ subclavian	Lef subclavian
	2,5%	3,7%	61,7%	32,1%
Insertion reason	Infusion of medications	Parenteral diet	Peripheral Access Difficulty	Others
	97,6%	1,2%	1,2%	0,0%
Lenght of stay	01-10 days	11-20 days	21-30 days	>31 days
	77,9%	13,5%	8,6%	0,0%
Reason for withdrawal	Death	End of treatment	Hospital leave	No record
	47%	23,4%	11,1%	18,5%

An analysis was also carried out regarding the presence of curative prescription by nurses in patients' medical records. Of the n = 81 = 100% of the charts, 76.5% had no prescription of dressings by nurses and 23.5% prescriptions. Regarding the daily evaluation of the place of insertion and surrounding skin, 50% answered that the evaluation occurs and 50% answered that the daily analysis is not performed.

## DISCUSSION

The CVC dressing should be performed according to the aseptic technique, for this it is necessary the correct hand hygiene, as the accomplishment of the hygiene of the hands obtained excellent result, 100% of the answers were right, being this one of the simplest

practices and effective prevention of infections, considered an effective measure in reducing transmission of microorganisms.<sup>6</sup>

There are several bacteria that remain impregnated in the fingers and hands, which can be transmitted to the catheter during insertion, for central catheters the mechanism of infection is facilitated, since it can occur both during insertion and in the manipulation of the device, so the practice of hand hygiene before handling the catheter is an essential practice.<sup>9</sup>

Adequate hygiene of the hands is an effective practice against blood infections, being an established practice before and after the manipulation of the device, it is instigated that in hospitals there is a rate of 38.7% adherence to this practice, despite the fact that importance its membership is still low.<sup>10</sup>

Five moments are recommended for hand hygiene in all health units: 1- before contact with the patient; 2 - before performing the aseptic procedure; 3 - after the risk of exposure to body fluids; 4 - after contact with the patient and 5 - after contact with areas close to the patient.<sup>11-12</sup>

Regarding the maximum protection barriers, all nurses involved in the study responded correctly, in agreement with the literature, this practice is associated with the prevention of CVC-related infections, consisting of caps, masks, masks, sterile gloves and expanded sterile field.<sup>1</sup>

In a study the adherence of 54% of maximum protection barriers in a study on adherence to the CVC Bundle in an adult ICU, emphasizing that the greater the achievement of this practice, the lower the risks of colonization in the patient.<sup>7</sup>

Regarding the most suitable place for insertion, there was a balance in the nurses' responses, 50% answered right subclavian and 50% were incorrect saying that the preferred site is the right jugular.

This study predominated in puncture in the right subclavian, corroborating with data from other studies, this route of choice is considered preferential and safer, since the rates of complications are lower (6.2%).<sup>6</sup>

The insertion site of the device influences the development of infections, and those inserted in the subclavian have a lower chance of this occurrence, while in the jugular they have a higher chance of complications because this site is closer to the secretions from the

oropharynx and because of difficulty in immobilizing the catheter by moving the site.<sup>1</sup>

The question about when to perform the first dressing change obtained 100% correct answers, and it is recommended by ANVISA that the first dressing change be made after 24 hours of the puncture.<sup>Erro! Fonte de referência não encontrada.</sup> The accomplishment of the dressings as a practice in the maintenance of the CVC, its adequate accomplishment results in the reduction of the risks of infection, besides promoting comfort and safety to the patient.<sup>10</sup>

The dressing with sterile gauze and antiallergic tape should be performed every 48 hours after the first dressing, if the cover is dirty, wet or loose to the exchange should be performed before. It is important to establish that the covers should be sterile, as well as, the exchange of the dressing should be based on the barriers of protection, with a sterile glove or use of tweezers. The dressing should be comfortable to the patient and be of simple handling to the health professional, providing ease and agility.<sup>13-</sup>

<sup>14</sup>

Dressings with gauze and antiallergic tape should be changed every 48 hours as recommended by ANVISA, but the evaluation of the insertion site must be daily and if it is dirty, damp or loose, it should be replaced immediately. It is instigated that the nurses are the professionals able to perform the exchange of the dressing of CVC, possessing sufficient knowledge for the proper exchange and in the correct time, therefore, it is up to this professional the nursing care associated with the evaluation of the place of puncture and maintenance.<sup>15-14</sup>

Regarding the dressing with the semitransparent membrane obtained 50% of the correct answers, being recommended the exchange every seven days, or sooner, if the membrane is dirty, loose or wet. This type of dressing has visibility of the insertion site, making it easier to identify possible contamination or infections, allowing direct catheter monitoring, better adapting the skin and making the site impermeable to water. Another favorable feature of the membrane is its replacement every seven days, reducing the direct manipulation of the catheter, consequently reducing the chances of infection.<sup>6-7</sup>

The use of chlorhexidine prior to insertion of the CVC and before the dressing is presented as a factor reducing the possibility of developing infections, compared with other antiseptics, according to the one recommended by ANVISA, chlorhexidine 0.5 to 2 % must be used to maintain the cleaning of the place and after the dressings must be made in order to maintain the cleaning of the place.<sup>12-15</sup>

In the documentary analysis, 97.6% of the catheters were inserted for administration of vasoactive medication, there are several indications for the CVC installation, in this study the use of medication administration was predominant, a factor that may be related to the diversity of drugs prescribed to patients complexes in ICUs, thus requiring the need for a vessel that is more gibberish, resistant and that directs the medicine rapidly to the heart.<sup>16</sup>

Another factor related to the development of infections is the type of infusion that is being administered to the patient. He

cites acidic solutions or causes intravenous irritation as the main factors responsible for the development of infection. Inotropes, vasopressors, chemotherapy and antibiotics.<sup>17-18</sup>

The CVC time was 1 - 10 days in 77.9% of the patients, characterized as Short - stay Catheter, 11 patients remained from 11 to 20 days and 07 patients from 21 to 30 days with CVC, those who remain for more than 21 days time have a great chance of infection development.<sup>19</sup>

Length of stay influences the development of possible complications, infectious or mechanical, the shorter the period of permanence of the patient with CVC, the risk is lower, a factor that will directly influence the time of hospitalization of this patient in the ICU.<sup>20</sup>

When CVC is used for a period longer than 48 hours the chances of developing Catheter-related infection are high and if infection occurs within 48 hours after withdrawal of the device it should also be associated with Catheter.<sup>21</sup>

Regarding the reason for the withdrawal, 47% withdrawn after death of the patient, the reasons for withdrawal of catheters provide important information about the evolution of the patient.

One of the indications for catheter removal is the development of complications, especially infectious ones that may occur at the puncture site or develop into the patient's bloodstream, however, in the present study there were no notes on the development of complications at the insertion site.

The high number of deaths can be related to several factors such as: severity of the initial

clinical diagnosis of the patients, the development of possible complications during the hospitalization or the general state of the patient.<sup>22</sup>

Regarding the notes in the records had no data on the type of CVC used on the patient and on the amount of lumens used, this information should be collected at the time of device passage and noted on the patient's medical record for future reference, also did not appear data on whether or not the X-ray is performed after the device has passed, to confirm the correct location of the CVC.

The prescription of dressings should be done by the nurse responsible for the sector, who must carry out the prescription in the patient's chart, making clear the type of dressing to be performed, as well as the materials that should be used and at what time the exchange should be made of the dressing, 76% of patients with CVC use in the ICU of this study had no dressing prescription, a worrying factor, since they should be routinely performed and strictly follow the exchange and cleaning measures, in order to keep the place clean, free of microorganisms and dirt.<sup>11</sup>

The catheter registry should be daily, in this question, 50% of the nurses answered that the daily registry occurs and 50% answered that it does not occur. However, 100% answered that the daily evaluation of the site is performed, this daily practice better promotes the follow-up of the patient's clinical condition, providing data about its evolution both in relation to the diagnosis and the use of the device, allowing to analyze the need to continue or not with the CVC.

Thus the data after the dressing should also be noted (color, odor, presence of phlogistic signs, among others), time that it was performed and make the appropriate check. It is observed that nurses are not always careful to note the evolution and characteristics of the CVC in the patient's chart.

## CONCLUSION

When questioned regarding hand hygiene, maximum protection barriers and the accomplishment of the first post-passage CVC dressing, they obtained excellent results 100% correct, and these processes are important measures to prevent infection within the hospital settings. Regarding the puncture site and the dressing with gauze and micropore as well as with semi-transparent membrane, 50% of correct answers were made, emphasizing the need for standardization of care for patients who use this device and requiring constant professional training.

Nursing prescription was inherent to the nurse, it was evidenced that of the: N = 81 (100%) of the medical charts surveyed, a total of 62 (76.5%), did not contain nursing prescription, a fact that is of concern, nursing care to the CVC patient, it was also found that 26 (21%) of the medical records had no notes referring to the patient with CVC, which corroborates with the study objectives, since not only the nursing prescription nurse, but also the care itself by this professional and the nursing team is of utmost importance to reduce infections and ensure the safety of that patient in question.



This research demonstrates the need for greater adherence of nursing professionals to the prescription of CVC dressings, as worrying data were evidenced, mainly due to the lack of prescription of the dressings, which does not generate the guarantee of their accomplishment.

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