ADHESION OF NURSING TO THE BLOOD CURRENT INFECTION PROTOCOL

ADESÃO DA ENFERMAGEM AO PROTOCOLO DE INFECÇÃO DE CORRENTE SANGUÍNEA

ADHESIÓN DE LA ENFERMERÍA AL PROTOCOLO DE INFECCIÓN DE CORRIENTE SANGUÍNEA

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ABSTRACT

Objective: to verify the adherence of the nursing team to the protocol of bloodstream infection in patients using intravascular catheters. **Method:** A quantitative, field, cross-sectional, observational and descriptive study was carried out in a special teaching hospital in six intensive care units. Nurses' checklists were used at the bedside, in the morning, afternoon and evening shifts, from May to August, 2017. Initial (baseline) characteristics were described with counts (%), averages (SD) or medians (IQR) when appropriate. **Results:** it was verified, in relation to the central venous catheter / peripheral venous access dressing, that 866 (91.64%) were correctly identified and 22 (2.33%) were dirty; 803 (84.97%) were correctly fixed and 11 (1.06%) were wet. Regarding identification, the teams were correct (n = 647; 68.47%) and the colored ribbons were present in 643 (68.04%). During ICU stay, 20 (2.12%) patients had bloodstream infection related to the use of a central catheter. **Conclusion:** high adherence of the nursing team to the protocol and low index of bloodstream infection related to the central venous catheter when compared with the literature. **Descriptors:** Nursing team; Clinical Protocols; Blood flow; Patient safety; Catheter-Related Infections. **Descriptors:** Nursing, Team; Clinical Protocols; Blood Circulation; Catheter-Related Infections; Patient Safety.

RESUMO

Objetivo: verificar a adesão da equipe de Enfermagem ao protocolo de infecção de corrente sanguínea em pacientes em uso de cateteres intravasculares. **Método:** estudo quantitativo, de campo, transversal, observacional e descritivo, desenvolvida em um hospital de ensino de porte especial, em seis unidades de terapia intensiva. Foram utilizados *checklists* preenchidos por enfermeiros à beira do leito, nos turnos matutino, vespertino e noturno, de maio a agosto de 2017. Características iniciais (basais) foram descritas com contagens (%), médias (DP) ou medianas (IQR) quando adequadas. **Resultados:** verificou-se, em relação ao curativo do cateter venoso central/acesso venoso periférico, que 866 (91,64%) estavam identificados corretamente e 22 (2,33%) estavam sujos; 803 (84,97%) estavam fixados de forma correta e 11 (1,06%) estavam úmidos. Em relação à identificação, os equipos estavam corretos (n=647; 68,47%) e as fitas coloridas estavam presentes em 643 (68,04%). Durante a permanência na UTI, 20 (2,12%) *pacientes tiveram infecção de corrente sanguínea relacionada ao uso de cateter central*. **Conclusão:** constatou-se alta adesão da equipe de Enfermagem ao protocolo e baixo índice de infecção de corrente sanguínea relacionada ao cateter venoso central quando comparado com a literatura. **Descritores:** Equipe de Enfermagem; Protocolos Clínicos; Corrente Sanguínea; Segurança do Paciente; Infecções Relacionadas a Cateter.

RESUMEN

Objetivo: verificar la adhesión del equipo de Enfermería al protocolo de infección de flujo sanguíneo en pacientes en uso de catéteres intravasculares. **Método:** estudio cuantitativo, de campo, transversal, observacional y descriptivo, desarrollado en un hospital de enseñanza de porte especial, en seis unidades de terapia intensiva. Se utilizaron *checklists* rellenos por enfermeros al borde del lecho, en los turnos matutino, vespertino y nocturno, de mayo a agosto de 2017. Las características iniciales (basales) se describieron con recuentos (%), medias (DP) o medianas (IQR) cuando adecuadas. **Resultados:** se verificó, en relación al curativo del catéter venoso central / acceso venoso periférico, que 866 (91,64%) estaban identificados correctamente y 22 (2,33%) estaban sucios; 803 (84,97%) estaban fijados de forma correcta y 11 (1,06%) estaban húmedos. En cuanto a la identificación, los equipos eran correctos (n = 647; 68,47%) y las cintas coloreadas estaban presentes en 643 (68,04%). Durante la permanencia en la UTI, 20 (2,12%) *pacientes tuvieron infección de corriente sanguínea relacionada al uso de catéter central*. **Conclusión:** se constató alta adhesión del equipo de Enfermería al protocolo y bajo índice de infección de corriente sanguínea relacionada al catéter venoso central en comparación con la literatura. **Descriptor:** Grupo de Enfermería, Protocolos Clínicos, Circulación Sanguínea; Seguridad del Paciente, Infecciones Relacionadas a Cateter.

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INTRODUCTION

It is understood that protocol is a specific care / care situation that contains operational details and specifications about what, who, and how it is done, leading professionals to decisions about care for the prevention, recovery or rehabilitation of health. They must have good formal quality, be easy to read, valid, reliable, correctly used and proven effective. All of this implies a rigorous construction process, adaptation to the local reality, as well as follow-up through indicators of use and effectiveness.¹

It is known that a care indicator is related to bloodstream infections, which are increasingly represented by different pathophysiologies, in addition to the diagnostic, therapeutic, prognostic and preventive implications, and are therefore considered multifactorial.² They are currently associated with hospitalization in long-term mechanical ventilation, invasive procedures, age, immunosuppression, use of antibiotics, basic diseases and nutrition.³

It is explained that primary bloodstream infections (PBSIs) are serious systemic infections, bacteremia or sepsis, with no detectable primary focus. The secondary is the occurrence of positive blood culture or clinical signs of sepsis in the presence of signs of infection elsewhere. Other infections related to vascular access are generally of lower severity than those of the bloodstream.²

In addition, the central venous catheter (CVC) plays an important role in the treatment of hospitalized patients, especially in critical conditions, in the Intensive Care Unit (ICU). This device aims to obtain physiological parameters and serves for the administration of drugs, blood and hydroelectrolytic solution. However, it represents a risk of infectious complications. Among them, local infection confirmed by colonization of the catheter and episodes of systemic infection that occur as a direct result of the presence of the device.⁴ From the handling until its removal, the responsibility is of the nurse and his team. Therefore, there is a need for knowledge, skills and training for the safe management of intravascular devices.⁵

It is reported that the occurrence of adverse events (AE) has a significant impact on the Unified Health System (UHS), resulting in an increase in morbidity and mortality, in the time of treatment of patients and in care costs, as well as repercussions in other fields of social life and economic.⁶

It is recalled that patient safety can be defined as preventing, preventing or improving adverse outcomes or injuries arising from the medical-hospital and home care process.⁷ The focus of patient safety is concern with the magnitude of the occurrence of AE.⁸

It is complemented that the most used intravascular device in the ICU is the CVC, being responsible for 90.0% of the ICS associated with the catheters. In these units, infection rates range from 18% to 54%, being approximately five to ten times greater than in another hospital stay, and their mortality rates show oscillations of 9% to 38% due to infections.⁹

OBJECTIVE

♦ To verify the adherence of the nursing team to the protocol of bloodstream infection in patients using intravascular catheters.

METHOD

This is a quantitative, cross-sectional, observational and descriptive study developed in a special education hospital in the interior of São Paulo, in six ICUs: General UHS (17 beds), Neurological (ten beds), Agreement (23 beds), Cardiology (24 beds), fifth floor SUS (20 beds) and Post Operative Unit (ten beds).

During daily multidisciplinary visits for the reduction of adverse events, IRAS and ICU mortality, checklists for the collection of information, filled by bedside nurses, were applied during the period from May to August, 2017. Were used, as references, protocols, norms and internal routines of the Nursing Service based on the National Patient Safety Program of the Ministry of Health and the recommendations of Hospital Infection Control (HIC).

It is described that the checklist consisted of 14 items with an emphasis on the identification of equipment, identifications and conditions of the central and peripheral access dressings, identification with colored ribbons in the access routes, and the protocol established was the Control Protocol for Infection Related to Health Care (Bloodstream Infection).

As inclusion criteria, all adult patients (≥ 18 years) with ICU stay longer than 48 hours were enrolled. Exclusion criteria were all patients who were on procedure at the time of data collection; patients admitted to the unit considering hospitalization less than three hours and patients with contraindication to the care provided.

Data was collected after approval by the Research Ethics Committee (REC), under Opinion No. 2,074,847, and the guidelines and

norms recommended by Resolution No. 466/12 of the National Health / MS, which regulate research involving human subjects.

RESULTS

A total of 945 patients were investigated, of which 538 (56.93%) were male. The age group with the highest prevalence was 61 to

80 years old, with 427 (45.19%) participants, and the lowest was the age range of up to 20 years, with 19 (2.01%). Regarding the length of hospital stay, 680 (71.96%) were hospitalized for approximately 15 days in the ICUs. Regarding mortality, it was observed that 32,80% (310) died, according to table 1.

Table 1. Characterization of patients regarding sex, age, length of hospital stay and ICU mortality. São José do Rio Preto (SP), Brazil, 2017.

Sex	N (945)	% (100%)	SD	SE
Male	538	56.93	92.63	3.01
Female	407	43.07		
Age				
Up to 20 years	19	2.01	163.14	5.31
21 to 40 years	107	11.32		
41 to 60 years	273	28.89		
61 to 80 years	427	45.19		
> 80 years	115	12.17		
Missing	4	0.42		
Length of stay				
Up to 15 days	680	71.96	264.68	8.61
16 to 30 days	185	19.58		
31 to 45 days	45	4.76		
46 to 60 days	15	1.59		
> 60 days	14	1.48		
Missing	6	0.63		
Mortality				
Yes	310	32.80	281.53	9.16
No	599	63.39		
Missing	36	3.81		

Legend - N: Records; %: Proportion; SD: Standard Deviation; EP: Standard Error

It was found that, in relation to the CVC / AVP dressing, 866 (91.64%) were identified; 22 (2.33%), dirty; 803 (84.97%), correctly fixed and 11 (1.06%) wet. Regarding the identification, 647 (68.47%) teams were identified and the colored ribbons were present in 643 (68.04%) teams, according to table 2.

Table 2. Identification, fixation and dressing conditions of CVC / AVP. São José do Rio Preto (SP), Brazil, 2017.

Information	Record (N=100)	Proportio n (% 100)	SP	SE
CVC/AVP - Identified				
Yes	866	91.64	477.18	15.52
Not identified	40	4.23		
Does not apply*	39	4.13		
CVC/AVP - Dirty				
Yes	22	2.33	495.42	16.12
No	887	93.86		
Does not apply *	36	3.81		
CVC/AVP - Loose				
Yes	104	11.01	423.91	13.79
No	803	84.97		
Does not apply *	38	4.02		
Total	945	100.00		
CVC/AVP - Humid				
Yes	11	1.16	504.19	16.40
No	897	94.92		
Does not apply *	37	3.92		
Identified team				
Yes	647	68.47	293.51	9.55
No	208	22.01		
Does not apply	90	9.52		
Colored tape on CVC				
According	643	69.04	299.21	9.73
Not according	57	6.03		
Does not apply	245	25.93		

Legend -N: Records; %: Proportion; SD: Standard Deviation; SE: Standard Error.

*Note: All patients in the ICU must necessarily have CVC or AVP. The "not applicable", reported in table 2, means that the data collection was not performed properly.

It was found that, during ICU stay, 20 related to the use of CVC, according to table (2.12%) patients had bloodstream infection 3.

Table 3. CVC-related bloodstream infection. São José do Rio Preto (SP), Brazil, 2017.

CVC	N (945)	% (100%)	SD	SE
Yes	20	2.12	639.93	20.82
No	925	97.88		

Legend -N: Records; %: Proportion; SD: Standard Deviation; SE: Standard Error.

It was observed that, when crossing the dependent variable CVC / AVP IDENTIFIED with the independent variables "Age", "Sex" and "Time of hospitalization", the variable with the greatest explanatory power of the dependent variable was "Time of hospitalization" (p = 0.027). However, this variable presented a degree of statistical.

However, when the variable CVC / AVP-DIRT was crossed with the independent variables "Age", "Sex" and "Time of hospitalization", the results showed that only age (p = 0.012) presented evidence dependency statistics.

When we crossed the dependent variable CVC / AVP-SOLTO with the independent variables, "Age", "Sex" and "Time of hospitalization", there is statistical evidence related to age (p = 0.022).

It was observed that, at the intersection between the variable CVC / AVP-HUMID with the independent variables "Age", "Sex" and "Length of hospitalization", the results showed

that only age (p = 0.46) presented statistical evidence of dependency.

When checking "Identified Equipment", "Age", "Sex" and "Length of Stay", there was no statistical evidence of dependence.

It was found differently, when analyzing the colored ribbons in the CVC with the variables "Age", "Sex" and "Time of hospitalization", that only Age (p = 0.003) presented statistical evidence of dependence.

In relation to the crossover with the dependent variable CVC / AVP-identified, dirty, loose, wet, equipment identified, alcohol in the bed and "Colored ribbons", no statistical evidence was found to be dependent. It was observed that the variable with greater explanatory power of the dependent variable oscillation was "CVC / AVP-SOLTO" (p = 0.125).

DISCUSSION

It is recorded that of the 945 patients verified, 538 (56.93%) were male. In a study

carried out in the hospital of a city in the interior of the State of Paraíba (PB), it was verified the prevalence of men in the ICU admissions. From a sample of 310 patients, 54.8% (n = 170) were males.¹⁰ The results of another survey in an adult ICU with 14 beds of a public hospital that exclusively serves the Unified Health System (UHS), located in the city of Florianópolis (SC), indicate that of a total of 695 patients, 61.6% were male. This may be due to men's low interest in health.¹¹

The most prevalent age group in this study was 61 to 80 years old (n = 427, 45.19%). In a study carried out in the ICU of a hospital in Goiânia (GO), the prevalence of the elderly was observed (50.7%), in the age group from 60 years of age.¹² Regarding the age group, study performed in the ICU of a general hospital in Fortaleza (CE) indicated an even higher percentage (68.3%) of patients aged ≥60 years.¹³

It is understood that aging is marked by a complex interaction of biopsychosocial factors and that the elderly need specific care and attention due to their state of greater vulnerability and risk of adverse clinical outcomes, such as functional decline, falls, hospitalization, institutionalization and death.¹⁴

In relation to hospitalization time, 680 (71.96%) patients were hospitalized for approximately 15 days in ICUs. A study carried out in a philanthropic hospital with tertiary care, in the city of Campo Grande (MS), Brazil,), points out that the length of stay of hospitalized ICU patients ranged from two to 49 days, with a mean of 13.97 and a median of 12.¹⁵

It was found, in relation to the mortality rate, that 310 (32.80%) patients hospitalized in the units died. In another study carried out in an ICU in Recife, Brazil, the "death" outcome occurred in 47.6% of the cases analyzed.¹⁶ In the United States, the mortality attributable to this syndrome generally exceeds 10% , and may reach 25% in some patients at higher risk.¹⁷

It is recalled that, during ICU stay, 20 (2.12%) patients had bloodstream infection related to the use of CVC. In a study performed at the Santa Casa de Misericórdia Hospital in São Paulo (SP), catheter-related infection occurred in 11 (9.64%) of 96 patients.¹⁸

It is performed in the CVC / AVP curative in which the following items are observed: identified; dirty; loose; humid The standard established in the protocol of the hospital studied indicates that, when the catheter dressing does not fit within the conformities

(without identification, loose, dirty or moist), the nurse of the sector should be informed and the same will provide the necessary adjustment.¹⁹ found articles that corroborated the data obtained, since the majority reports how the dressing should be done and does not describe the items checked in this study.

It is reported that no data were collected on the type and range of dressing replacement in this study. However, the protocol established in the ICUs includes the exchange of the cover with sterile gauze every 48 hours, or before, if it is dirty, loose or moist and for semipermeable transparent cover every seven days, or before, if dirty, loose or wet.¹⁹ Study reported that the first dressing should be performed 24 hours after CVC implantation and, when performed with dry gauze and porous hypoallergic adhesive tape, should be changed within 48 hours and, when done with film, within seven days. The need for change in this interval will be assessed and indicated by the nurse.²⁰ Both studies recommend that all dressings should be protected during bathing.¹⁹⁻²⁰

It was found that 68.04% of the teams were correctly identified with colored ribbons, as recommended in the hospital routine. The color standardization of adhesive tapes and their respective invasive devices are: red tape for invasive blood pressure (IPA); blue tape for central venous catheter (CVC) routes; yellow tape for nasogastric tube (SNG), nasoenteral (SNE), orogastric tube (SOG) and oroenteral tube (SOE) and green adhesive tape for intracranial pressure catheter (PIC).²¹ No articles were found that showed statistics with regard to this standardization.

It was identified that 68.47% of the teams were identified according to the protocol of the institution. However, no articles were found on this data. The interval of equipment exchange according to the institution's protocol is up to 96 hours, ¹⁹ corroborating the literature, in which continuous infusion equipment should not be changed at intervals of less than 96 hours ²² and emphasizes that repeated disconnections with consequent reconnection of the system increases the risk of contamination of the equipment luer, catheter hub and needleless connectors, with consequent risk of IPCS. The tip of the equipment must be protected aseptically with a single-use, sterile protective cap if disconnection is required. Do not use needles for protection.²³

CONCLUSION

High adherence of the nursing team to the protocol for the prevention of bloodstream

infection was observed, in relation to the high compliance index of preventive actions, such as identification, hygiene conditions and CVC / AVP fixation, identification of the equipment and presence of tape colored in the CVC. There was also a low rate of CVC-related bloodstream infection when compared to the literature.

REFERENCES

1. Pimenta CAM, Lopes CT, Amorim AF, Nishi FA, Shimoda GT, Jensen R. Guia para construção de protocolos assistenciais de enfermagem [monografia na Internet]. São Paulo: COREN-SP; 2017 [cited 2017 MaY 02]. Available from: <http://portal.coren-sp.gov.br/sites/default/files/Protocolo-web.pdf>.
2. Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. Critérios diagnósticos de infecções relacionadas à assistência à saúde [Internet]. Brasília: Ministério da Saúde; 2013 [cited 2017 May 02]. Available from: <http://www20.anvisa.gov.br/segurancado paciente/images/documentos/livros/Livro 2-CriteriosDiagnosticosIRASaude.pdf>
3. Ferreira MVF, Andrade D, Ferreira AM. Infection control related to central venous catheter impregnated with antiseptics: an integrative review. Rev Esc Enferm USP. 2011 Aug;45(4):1002-6. Doi: <http://dx.doi.org/10.1590/S0080-62342011000400030>
4. Passamani RF, Souza SROS. Infecção relacionada a cateter venoso central: um desafio na terapia intensiva. Rev Hosp Universitário Pedro Ernesto UERJ [Internet]. 2011 [cited 2017 May 29];10 (Supl 1):100-10. Available from: http://revista.hupe.uerj.br/detalhe_artigo.asp?id=128
5. Ogston-Tuck S. Intravenous therapy: guidance on devices, management and care. Br J Community Nurs. 2012 Oct;17(10):474-6-9,482-4. Doi: [10.12968/bjcn.2012.17.10.474](https://doi.org/10.12968/bjcn.2012.17.10.474)
6. Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. Investigação de eventos adversos em serviços de saúde [Internet]. Brasília: Ministério da Saúde; 2013 [cited 2017 Jun 13]. Available from: http://www.saude.pr.gov.br/arquivos/File/05 EGURANCA_DO PACIENTE/modulo5.pdf
7. Rigobello MCG, Carvalho REFL, Cassiani SHB, Galon T, Capucho HC, Deus NN. The climate of patient safety: perception of nursing professionals. Acta Paul Enferm. 2012;25(5):728-35. Doi: <http://dx.doi.org/10.1590/S0103-21002012000500013>
8. Brennan TA, Leape LL, Laird NM, Hebert L, Localio AR, Lawthers AG, et al. Incidence of adverse events and negligence in hospitalized patients. Results of the Harvard Medical Practice Study I. N Engl J Med. 1991 Feb;324(6):370-6. Doi: [10.1056/NEJM199102073240604](https://doi.org/10.1056/NEJM199102073240604)
9. Centers for Disease Control and Prevention. Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-central Line Associated Bloodstream Infection) [Internet]. Atlanta: CDC; 2018 [cited 2017 June 20]. Available from: http://www.cdc.gov/nhsn/PDFs/pscManual/4_PSC_CLABSCurrent.pdf
10. Sousa MNA, Cavalcante AM, Sobreira REF, Bezerra ALD, Assis EV, Feitosa ANA. Epidemiologia das internações em uma unidade de terapia intensiva. C&D Rev Eletrônica Fainor [Internet] 2014 July/Dec [cited 2018 Jan 24];7(2):178-86. Available from: <http://srv02.fainor.com.br/revista/index.php/memorias/article/viewFile/288/203>.
11. Rodriguez AH, Bub MBC, Perão OF, Zandonadi G, Rodriguez MJH. Epidemiological characteristics and causes of deaths in hospitalized patients under intensive care. Rev Bras Enferm. 2016 Mar/Apr;69(2):210-4. Doi: <http://dx.doi.org/10.1590/0034-7167.2016690204j>
12. Oliveira PC. Perfil epidemiológico da unidade de terapia intensiva de um hospital de reabilitação [Internet] [monography]. Goiânia: Pontifícia Universidade Católica de Goiás; 2013 [cited 2018 Jan 24]. Available from: <http://www.ceafi.com.br/biblioteca/pagina/14/perfil-epidemiologico-da-unidade-de-terapia-intensiva-de-um-hospital-de-reabilitao>
13. Cabral VH, Andrade IRC, Melo EM, Cavalcante TMC. Prevalence of nursing diagnoses in an intensive care unit. Rev Rene. 2017 Jan/Feb;18(1):84-90. Doi: [10.15253/2175-6783.2017000100012](https://doi.org/10.15253/2175-6783.2017000100012)
14. Almeida ABA, Aguiar MGG. Nursing care of the hospitalized elder: a bioethical approach. Rev Bioét [Internet]. 2011 [cited 2018 Jan 25];19(1):197-217. Available from: http://revistabioetica.cfm.org.br/index.php/revista_bioetica/article/view/615/632
15. Lopes APAT, Oliveira SLCB, Sarat CNF. Infecção relacionada ao cateter venoso central em unidades de terapia intensiva. Ensaios Ciênc Biol Agrárias Saúde [Internet]. 2012 [cited 2018 Jan 25];16(1):25-41. Available from: <http://pgsskroton.com.br/seer/index.php/ens aioeciencia/article/viewFile/2816/2669>

16. Gomes AC, Carvalho PO, Lima ETA, Gomes ET, Valencia MP, Cavalcanti ATA. Characterization of infections related to health care in the intensive care unit. *Rev Enferm UFPE on line*. 2014 June; 8(6):1577-85. Doi: [10.5205/reuol.5876-50610-1-SM.0806201417](https://doi.org/10.5205/reuol.5876-50610-1-SM.0806201417)

17. Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. Critérios diagnósticos de infecção relacionada à assistência à saúde [Internet]. 2nd ed. Brasília: Ministério da Saúde; 2017 [cited 2018 Jan 30]. Available from: <http://portal.anvisa.gov.br/documents/33852/271855/Crit%C3%A9rios+Diagn%C3%B3sticos+d e+IRAS++2+Ed/b9cd1e23-427b-496f-b91a-bbdae23ece63>

18. Siqueira GLG, Hueb W, Contreira R, Nogueron MA, Cancio DM, Caffaro RA. Catheter-associated bloodstream infections (CA-BSI) in wards: a prospective comparative study between subclavian and jugular access. *J Vasc Bras*. 2011 July/Sept;10(3):211-6. Doi: <http://dx.doi.org/10.1590/S1677-54492011000300005>

19. Hospital de Base de São José do Rio Preto. Protocolo de medidas de prevenção de Infecção de Corrente Sanguínea associada à assistência a saúde. São José do Rio Preto: Hospital de Base; 2017.

20. Carvalho ALG, Rosa LM. Dressing of central venous catheter of short permanence: nursing care. *J Nurs UFPE on line*. 2014 July;8(7):1972-8. Doi: [10.5205/reuol.5963-51246-1-RV.0807201419](https://doi.org/10.5205/reuol.5963-51246-1-RV.0807201419)

21. Hospital de Base de São José do Rio Preto. Identificação de dispositivos invasivos com fitas adesivas coloridas. Rotina Nº 90. São José do Rio Preto: Hospital de Base; 2015.

22. Marschall J, Mermel LA, Fakih M, Hadaway L, Kallen A, O'Grady NP, et al. Strategies to prevent central line-associated bloodstream infections in acute care hospitals: 2014 Update. *Infect Control Hosp Epidemiol*. 2014 July;35(7):753-71. Doi: [10.1086/676533](https://doi.org/10.1086/676533)

23. Ministério da Saúde (BR), Agência Nacional de Vigilância Sanitária. Segurança do paciente e qualidade em serviços de saúde. Medidas de prevenção de infecção relacionada à assistência à saúde [Internet]. Brasília: Ministério da Saúde; 2017 [cited 2018 Jan 11]. Available from: <http://cenfewc.com.br/wp-content/uploads/2017/03/Medidas-de-Preven%C3%A7%C3%A3o-de-Infec%C3%A7%C3%A3o-Relacionada-%C3%A0-Assist%C3%A2ncia-%C3%A0-Sa%C3%BAde.pdf>

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