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ORIGINAL ARTICLE

ADHERENCE TO THE PROTOCOL FOR THE PREVENTION OF URINARY TRACT INFECTION

ADESÃO AO PROTOCOLO DE PREVENÇÃO DE INFECÇÃO DO TRATO URINÁRIO ADHESIÓN AL PROTOCOLO DE PREVENCIÓN DE INFECCIÓN DEL TRATO URINARIO

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ABSTRACT

Objective: to identify the adherence to the protocol of prevention of infection of the urinary tract according to the conditions of hygiene, identification, fixation and location of the bladder catheter of delay. **Method:** this is a quantitative, field-based, analytical, and cross-sectional study with data collected through the bedside checklist at six ICUs. The results were analyzed by the Multiple Linear Regression Statistical Test and Student's t test, presented in tables. **Results:** it was identified that of the 945 checks, 403 men and 346 women required SVD. Statistically significant results were found when crossing SVD fixed with hospitalization time and with sex; SVD / soil with time of hospitalization and with sex; SVD identified with length of hospital stay. The main reason for the infection is the use of SVD and the most prevalent microorganism, *Escherichia coli*. **Conclusion:** there was a high adherence of the nursing team to the protocol for the prevention of urinary tract infection, with a low infection rate and a high level of compliance regarding hygiene, identification, fixation and location of SVD. **Descriptors:** Nursing Team; Infection; Urinary Tract; Protocols; Patient Safety; Intensive Care Units.

RESUMO

Objetivo: identificar a adesão ao protocolo de prevenção de infecção do trato urinário de acordo com as condições de higiene, identificação, fixação e localização da sonda vesical de demora. **Método:** trata-se de estudo quantitativo, de campo, analítico, explicativo e transversal, com dados coletados por meio de *checklist* à beira do leito em seis UTIs. Analisaram-se os resultados pelo Teste Estatístico de Regressão Linear Múltipla e teste *t* de Student, apresentados em tabelas. **Resultados:** identificaram-se que das 945 checagens, 403 homens e 346 mulheres necessitaram de SVD. Encontraram-se resultados estatisticamente significantes ao cruzar SVD fixada com tempo de internação e com o sexo; SVD/sujidade com o tempo de internação e com o sexo; SVD identificada com tempo de internação. Consideram-se o principal motivo da infecção o uso de SVD e o microrganismo mais prevalente, a *Escherichia Coli*. **Conclusão:** verificou-se alta adesão da equipe de enfermagem ao protocolo de prevenção de infecção do trato urinário, com baixo índice de infecção e alto nível de conformidades em relação à higiene, identificação, fixação e localização da SVD. **Descritores:** Equipe de Enfermagem; Infecção; Trato Urinário; Protocolos; Segurança Do Paciente; Unidades de Terapia Intensiva.

RESUMEN

Objetivo: identificar la adhesión al protocolo de prevención de infección del tracto urinario de acuerdo con las condiciones de higiene, identificación, fijación y localización de la sonda vesical de demora. **Método:** se trata de estudio cuantitativo, de campo, analítico, -explicativo y transversal, con datos recogidos por medio de *checklist* al borde del lecho en seis UTIs. Se analizaron los resultados por el Test Estadístico de Regresión Lineal Múltiple y test *t* de Student, presentados en tablas. **Resultados:** se identificaron que de las 945 chequeos, 403 hombres y 346 mujeres necesitaron SVD. Se encontraron resultados estadísticamente significantes al cruzar SVD fijada con tiempo de internación y con el sexo; SVD / suciedad con el tiempo de internación y con el sexo; SVD identificada con tiempo de internación. Se considera el principal motivo de la infección el uso de SVD y el microorganismo más prevalente, la *Escherichia Coli*. **Conclusión:** se verificó alta adhesión del equipo de enfermería al protocolo de prevención de infección del tracto urinario, con bajo índice de infección y alto nivel de conformidades en relación a la higiene, identificación, fijación y localización de la SVD. **Descriptores:** Grupo de Enfermería; Infección; Sistema Urinario; Protocolos; Seguridad del Paciente; Unidades de Cuidados Intensivos.

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INTRODUCTION

It is understood that patient safety is a structured institutional policy to reduce risks of unnecessary damage associated with health care, remaining at an acceptable level,¹ which is being collected by health institutions in order not to cause harm during therapy making it fast and effective.²

Unnecessary damage to adverse events (AE), which may result in unintended injury or complications in customer service, having as an effect, the prolonged hospitalization or even death, being more common for these AE to happen from Nursing for being more involved in care.¹

It is observed that among the AEs are the Health Care Related Infections (IRAS), which are acquired in the hospital environment, shortly after the admission of the patient to the hospital,² or 72 hours after discharge from hospital.³ Infections are thought to be caused by bacteria that decompensate with disease defense mechanisms and increased exposure to pathogens.⁴ Among IRAS, Urinary Tract Infection (UTI) is second only to other infections prevalent in North American hospitals and, in percentage, they affect from 30% to 50% of individuals in a hospital environment.⁵

Most of the causes of UTI are associated with bladder catheterization,²⁻⁶ and may be highlighted as dominant in pregnant women, elderly, diabetic, coronary heart disease,² female, severe baseline diagnosis, renal failure, diabetes mellitus, and meatal colonization of the patient.⁴ A UTI associated with a bladder catheterization is considered to be any symptomatic urinary tract infection in a patient.⁷

Associated symptoms and presence of bacteria in the urine are reported in ITU, being considered more frequent in hospitals,⁸⁻⁹ ranging from serious damages to affected patients, to the impact on the hospital economy,⁸ extending hospitalization time, and even increase the mortality rate and, concurrently with the increase in hospital stay, the cost of hospitalization increases.⁵

It is noted that it is necessary for the health professionals involved in the care of this patient, who needs bladder catheterization, to understand the need to correctly perform hand hygiene by manipulating the bladder catheter of the periurethral region before inserting the bladder catheter in the individual and provide more secure care.^{5,10}

It is noteworthy that bacteria that promote UTI can affect the lower urinary tract, causing

cystitis and urethritis, or those affecting the upper urinary tract (kidneys and renal pelvis) and cause the so-called pyelonephritis.¹¹

It is noteworthy that UTI is normally caused in a hospital environment, especially in patients requiring bladder catheterization,¹⁰⁻¹¹ being one of the most practiced procedures in the health area,⁸ because, for performing the survey, sterile technique is required and asepsis of the patient so that it is performed correctly. If the material is contaminated during the placement or the aseptic technique is performed in an erroneous way, the risk for UTI becomes greater, as well as the time of exposure of this foreign body in the individual.^{5,11} It can be taken into consideration culture medium, the catheter inserted into the urethra and the residence flask, does not allow the bladder to be emptied completely increasing the chance of bacteria multiplying.⁸

It should be noted that the most common bacteria found in the urinary tract are: *Escherichia coli*, *Proteus* spp., *Pseudomonas aeruginosa*, *Klebsiella* spp., *Enterobacter* spp. and *Enterococcus* spp. and the most common fungus is *Candida* spp.⁹⁻¹² As ANVISA advocates, there are ways to prevent UTI in hospitalized patients using the Bladder Delay Probe (BDP). The correct handling of the catheter is emphasized: after insertion, securely fasten and do not allow traction or movement; keep the drainage system closed and sterile; do not disconnect the catheter or drain hose unless irrigation is required; change the entire system when disconnection occurs, breakage of aseptic technique or leakage; for urine examination, collect small sample by aspirating urine with a sterile needle.⁷

It is also recommended by ANVISA: after disinfection of the collection device, immediately take the sample to the laboratory for culture; keep the urine flow clear; empty the collecting bag regularly using the individual collection container and avoid contact of the drainage tube with the collection container; always keep the collection bag below the bladder level; perform routine hygiene of the meatus and whenever necessary.⁷

It is thought that the damage caused by bladder catheterization to the patient may increase the length of hospital stay and lead to death. The importance of proper handling before, during and after insertion of the catheter through the urinary tract, and the need to stay for the given medical time can be seen in addition to the cost generated for the hospital. The importance of a protocol

that demonstrates to the professionals involved in the care of the patient using BDP, the steps and the best way to preserve it from a possible UTI.

OBJECTIVE

- To identify the adherence to the protocol of prevention of infection of the urinary tract according to the conditions of hygiene, identification, fixation and location of the bladder delay probe.

METHOD

This is a quantitative, analytical, field-specific, cross-sectional study developed at a teaching hospital in the interior of the State of São Paulo, Brazil. The data were collected from May to August 2017 with 945 patients using a nurse-filled bedside checklist to measure AEs related to UTI in six ICUs.

Internal references, protocols, norms and routines of the Nursing Service were used as references, based on the National Patient Safety Program of the Ministry of Health and on the recommendations of Hospital Infection Control (HIC).

A checklist for this study was made up of the following items: fixation, presence of dirt, identification, location of the BDP below the bladder level and the protocol used was the Protocol of Controls of Infection related to Health Care (Urinary Tract Infection).

All adult patients (≥ 18 years) with ICU stay longer than 48 hours were considered as inclusion criteria, and exclusion criteria, all of which were in procedure at the moment of data collection; patients admitted to the unit, considering hospitalization less than three hours; patients with contraindication to the care provided. Excel® software was used to correlate data by means of groupings in several subgroups by percentages and statistical calculations.

The results were analyzed by the Multiple Linear Regression Statistical Test and Student's t-test, which is used to evaluate if there is a significant difference between the means of two samples.

Data collection was carried out after approval of the research project in the Research Ethics Committee (REC) under Opinion no. 2,074,847, respecting the guidelines and standards recommended by Council Resolution 466/12 National Health / MH.

RESULTS

945 patients were checked between May and July 2017, and 56.93% were male. The age of greatest prevalence was 61 to 80 years, corresponding to 427 (45.19%). As for length of hospital stay, the longest stay was up to 15 days in the units (71.96%). Patients requiring BDP ($n = 749$, 79.25%) corresponded to 403 (53.8%) males and 346 (46.2%) of the opposite sex.

It was found that the majority of patients, 707 (74.81%), were in agreement with correct fixation of the catheter. Significant data were shown in the results at BDP intersection with hospitalization time ($p = 0.011$) and BDP fixed in relation to sex ($P = 0.000$). When the soiling conditions of the probing system were verified, 742 (78.51%) of the BDP were cleaned, according to the hospital protocol recommended. When data on BDP were crossed with hospitalization time and BDP with sex, statistical significance was found for the study, respectively, of $p = 0.011$ and $p = 0.000$.

It was found that 721 (76.29%) BDP were identified, describing the name of the professional who performed the catheterization, the date the procedure was performed and the probe number. When one crossed the BDP identified with the length of hospital stay, one found a statistically significant result ($p = 0.18$). 100% of the patients with the collection bag below the bladder level were found, which avoids the return of diuresis, according to table 1.

Table 1. Frequency of fixation, hygiene conditions, identification and location of BDP and diuresis collecting bag. São José do Rio Preto, 2017.

	n	%
BDP Fixation		
Fixed	707	74.81%
Not Fixed	42	4.44%
Without BDP	196	20.74
TOTAL	945	100%
BDP dirt		
Clean BDP	742	78.51
Dirty BDP	7	0.74%
Without BDP	196	20.74
TOTAL	945	100%
BDP Identification		
Identified BDP	721	76.29%
Non Identified BDP	28	2.96%
Without BDP	196	20.74
TOTAL	945	100%
BDP below bladder level		
In accordance with	749	79.25%
Not in accordance	0	0.00%
Without BDP	196	20.74%
Total	945	100%

Key - N: Records; %: Proportion.

As for UTIs, the results show that 35 (4.6%) patients on BDP use them during the hospitalization period, of which 21 (2.8%) were male. The most prevalent age group was 41 to 60 years, followed by 61 to 80 years. The time of hospitalization related to UTI had

a prevalence of up to 15 days, followed by hospitalized patients for 60 days or more. Of the 35 subjects who acquired ITU, eight (22.86%) presented, as a clinical outcome, death, according to table 2.

Table 2. Characterization of patients who acquired UTI by BDP regarding gender, age, length of hospital stay and mortality rate. São José do Rio Preto, 2017.

Sex	N	%	SD	SE
Male	21	60.00	4.95	0.84
Female	14	40.00		
TOTAL	35	100.00		
Age				
21 to 40 years	3	8.57	8.03	1.36
41 to 60 years	18	51.43		
61 to 80 years	13	37.14		
>80 years	1	2.86		
>80 years	115	12.17		
TOTAL	35	100.00		
Length of stay				
Up to 15 days	14	40	4.53	0.77
16 to 30 days	5	14.29		
31 to 45 days	4	11.43		
46 to 60 days	3	8.57		
>60 days	9	25.71		
TOTAL	35	100.00		
Mortality				
Yes	8	22.86	12.90	2.18
No	26	74.29		
Missing	1	2.86		
Total	945	100,00		

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

It should be noted that no statistically significant results were found when crossing UTI with fixed BPD, dirty BPD, BPD identified, sex, age and mortality rate. However, the time of hospitalization with significant values (p = 0.000) for this study was evidenced.

Of the 35 patients who had a urinary tract infection during the hospitalization related to the bladder catheter, 12 (1.27%) had UTI as the main cause of the probing and two (0.21%) were symptomatic. However, the risk factors that contributed to this event were not reported since the microorganisms did not

cause the infection. As for individuals who had microorganisms as factors for UTI, ten (1.06%) contracted *Escherichia coli*; four (0.32%), KPC; three (0.32%), *Klebsiella pneumoniae*; one (0.11%), *Staphylococcus aureus*; one (0.11%), *Serratia Marcences* and one (0.11%), *Enterococcus faecalis*.

DISCUSSION

It is revealed that of 945 patients checked in the period from May to July 2017, 749 (79.25%) were submitted to BPD, 403 (53.8%) men and 346 (46.19%) women. This is a high result when compared to the study of a hospital in the interior of Minas Gerais, where the analysis was performed over a two-year period, and 227 (100%) hospitalized patients used BPD,¹⁰ but is a lower result than of a study performed at a hospital in Florianópolis, São Paulo, Brazil, showing data reporting that 250 (100%) patients underwent BP within a month, taking into account that there is only one ICU with 13 beds.¹³

In general, the high complexity of patients in the ICU requires BDP, for a certain time or not, either through urinary tract obstruction, urinary retention, need for sedative or rigorous diuresis control.¹⁴⁻⁶ It is considered BDP also necessary in the postoperative of urological surgeries, in patients with interstitial cystitis and in immunotherapy in bladder cancer.¹⁵⁻⁶

It is observed that it is contraindicated the use of BDP in patients who do not need more rigorous control of diuresis, in those who have urinary incontinence without presenting risks to themselves and with neurogenic bladder that has the possibility of using intermittent catheter.¹⁴ It is defined the ITU according to the CDC / NHSN criteria as any infection that occurred while the patient had BDP in place in the two-day catheterization period, associated with fever > 38°C and positive urinary culture of more than¹⁰⁻⁵ Training Unit of Colonies (TUC).¹⁷

Recent surveillance has been published in six hospitals in three Arab Gulf countries (Saudi Arabia, Oman and Bahrain) showing that the overall ITU rate was 3.2 per 1,000 days / catheter. This rate was considered 35% higher than that of the National Healthcare Safety Network (NHSN) hospitals, but 37% lower than the hospitals of the International Nosocomial Infection Control Consortium (INICC).¹⁷

It is known that erroneous fixation or non-fixation of BDP is an important factor in preventing injury to the patient's urethra due to excessive manipulation of the catheter¹⁸ and consequently causing UTI.¹⁸⁻⁹It is

considered that the correct The catheter's attachment to the woman is on the inner face of the thigh and, in men, on the lower abdomen¹⁸⁻¹⁹ or the inguinal region, in order to reduce the urethral curve and thereby decrease the pressure on the penis-scrotum angle by avoiding a possible fistula.¹⁹

In this study, 707 (74.81%) of the BDPs were correctly fixed, there was a significant result regarding BDP fixation in relation to length of hospital stay ($p = 0.011$) and also in relation to sex ($p = 0.000$). Results similar to those of this study could be evaluated in a study conducted in the same teaching hospital in 2014, where the focus was on only three ICUs, with a total of 450 patients, where it was found that the majority were the correct fixation, 41 (82%) in the morning period, 40 (80%) in the afternoon and 30 (60%) at night.²⁰ Another study was carried out in an ICU of a general hospital in Florianópolis/SC, demonstrated that, of the 250 patients surveyed, 208 (83%) had unfixed BDP. It is also reported that three men were with urethral trauma presenting with bleeding and hyperemia in the penis.¹³

When the hygiene conditions of the probing system were checked, significant statistical values were found for the study in relation to the length of hospital stay ($p = 0.011$), since only seven presented dirt. It is observed that, although there were no studies that corroborate the findings of this study regarding the staining of the vesical catheter of delay, data from the literature and the protocol of measures of prevention of UTI associated with health care show the importance of maintaining the perianal and meatal regions correctly hygienized, because cases of infection related to bladder catheterization are prevented, and hygienization with soap and water is required at least once or twice a day.¹¹⁻⁷

Statistical significance was shown for the identification of diuresis pockets related to length of hospital stay ($p = 0.018$), indicating that only 28 (2.96%) of BDP were not identified. It should be identified the BDP with the description of the professional who performed the procedure (name), the date it was performed and the number of the catheter.^{2,14} No studies were found that used this indicator and that show the importance of correct identification of the collection bag of the BDP system, and it is important to identify the period of time of use and the caliber used, since this factor contributes to the urinary meatus lesion.

It is explained that the collecting bags that are connected to the sterile system of the

bladder catheter should be positioned below the level of the bladder^{2,11} in order to avoid the return of diuresis to the bladder.² They should be attached to the bed gratings facilitating the drainage of urine and should be kept away from the ground.¹¹ It was observed that of the patients checked, 100% were in agreement with the hospital protocol. A study was carried out in a hospital in Florianópolis / SC and 234 (97%) of the collection bags were below the bladder level and seven (3%) above. It was reported that six were on the same level as the patient and in one case the pocket was above the level of the bladder, fixed to the upper part of the bed.¹⁹

It is inferred that of the 749 BDP patients, 35 (4.6%) acquired UTI during the hospitalization period, of which 21 (60%) were male. The most prevalent age group was 41 to 60 years (51.43%), followed by 61 to 80 years (37.14%). It is considered that the female and the advanced age are predisposing factors to acquire UTI,²⁻⁴ but in this study there are no significant statistics for age and sex.

It should be emphasized that, since UTI is the site of higher incidence of infection due to the conditions in which patients are (immunosuppressive and antimicrobial use, invasive devices such as central venous catheter, BDP, mechanical ventilation), making individuals most commonly exposed to IRAS,²⁰ advanced age presents more viability in comorbidities in both sexes.¹⁰⁻⁹

It is seen that in men, anatomical abnormalities such as narrowing of the urethra, for example, may occur. In women, menopause is a contributing factor in addition to functional changes in the bladder (whether or not related to multiparity), such as cystocele.¹⁰ A two-year study was carried out in a hospital in the interior of Minas Gerais. It was concluded that, of the 227 patients submitted to BDP, only 12 (5.3%) had UTIs, seven (58.3%) men and five women (41.7%) with a prevalent age above 60 years.¹⁰

Another four-month study involving 63 patients, performed at the Hospital das Clínicas of the Federal University of Pernambuco, corroborates the findings of this study, showing that only 21 (37.5%) of the patients analyzed had UTI, with prevalence in the age group of 60 years.²⁰ It is seen in disagreement with this study, a survey carried out in an ICU of a Natal / RN hospital shows 84 (56.8%) women with UTI. The age group of the patients is similar to that of this study, 61 years old or older (n = 45, 54.3%).¹²

The study shows 14 people, corresponding to 40% of cases of UTI, with an hospitalization

time of up to 15 days, followed by nine (25.71%) people with a stay of 60 days or more in ICUs. In contrast to the findings, the University of Pernambuco study shows that 12 individuals (85.7%) acquired UTI, followed by a period of 16-30 days of hospitalization, corresponding to seven (46.7%) patients.²⁰

A study in a hospital in the southern area of Teresina (PI) points out an average of 21 to 30 days of hospitalization for individuals who acquired UTI by BDP, with a total of 14 people (47%).⁴ Significant results were shown in this study with the length of stay in relation to acquiring UTI (p = 0.000), when analyzing ICU stay for 15 days and also for 60 days or more. Prolonged BDP use may be associated with a higher likelihood of UTI.^{4,11-2}

Included in the risk factors for UTI prolonged catheterization, in which each day of in situ catheter increases the incidence of bacteriuria in 3% to 7%, female sex, advanced age, immunosuppressed, diabetes mellitus, orthopedics, neurological conditions and severely ill patients. Risk factors for UTIs are considered to include neutropenia and renal impairment and are directly and indirectly linked to increased morbidity and mortality.¹⁵ It does = if necessary to assess the actual needs of BDP use for each individual by checking the time of use. In addition to leaving the patient exposed and susceptible to other possible infections and being more likely to spread multidrug-resistant bacteria to the environment, prolonged hospitalization time increases the costs of hospitalization.¹³⁻²¹

In the study, it was demonstrated that the main reason to acquire UTI was BDP, corresponding to 12 (1.27%) patients, but no data were collected on the factors contributing to these UTIs. It was verified that in ten (1.06%) individuals who had UTI, followed by *Klebsiella Pneumoniae* Carbapenemase (KPC) in uroculture (n = 4, 0.42%).

A study carried out in the southern Teresina hospital showed that, of 30 patient files analyzed, ten (33.33%) presented *Escherichia coli* as a prevalent microorganism.⁴ It is shown that a study carried out in the State of Minas Gerais, of 227 patients submitted to BDP, only 12 (5.3%) had ITU. It was identified that *Escherichia coli* was the most prevalent bacterium in only two (16.7%) patients,¹⁰ which corroborates this study. This is due to the fact that gram-negative bacteria, mainly *E. Coli*, followed by *Klebsiella* sp, *Pseudomonas* sp, *Enterobacter*, *Acinetobacter*, among others, are virulent bacteria and the main responsible for UTI.^{4,10-2}

The UTI rate of 2.3 to 4.4 was reported in a multicenter study of 12 medical and surgical ICUs at Saudi Ministry of Health hospitals using Device Assisted Infection, comparing PAV, CVC, and UTI; however, the details of the UTI Preventive Measures Methodology in this study were missing. This study was started with an almost identical UTI rate and, based on our locally adopted UTI preventive interventions, strict compliance and periodic monitoring of surveillance reports and corrections with the FOCUS-PDCA program, we achieved the rate reduction goal UTI.²²

It is understood that the need to have and maintain a hospital protocol, in addition to performing training based on it, is aimed at decreasing rates of UTIs and other IRAS,² in addition to reducing the number of deaths related to infections. It was observed in this study that the mortality rate related to UTI was low, where only eight (22.86%) patients had, as a clinical outcome, the death related to UTI. This result can be related to the correct use of the existing care protocol in the field hospital of this study. A study was carried out in a hospital in the interior of Minas Gerais, which corroborates this study, showing that only two (16.7%) of those who had ITU died during hospitalization.¹⁰

It was found that although no study was found showing that UTI is a cause of mortality, and this study does not show statistical significance for UTI being related to death, the literature describes UTI caused mainly by BDP, a relevant factor and indices of mortality,^{4,10-1} because with the use of the catheter increases the chance of microorganisms spreading through the urethra when, when inserted, there is contamination or is subsequently contaminated by mismanagement.²⁰

It is advised that in order to avoid contamination both in the insertion of the catheter and in the manipulation afterwards, it is necessary that the professional or caregiver does the hygiene of the hands, use sterile gloves for the insertion and procedure for manipulation, hygienize the intimate region of the patient^{2,14} and in case of disconnection of the system or contamination of materials, the replacement of the catheter is indicated for greater patient safety.^{7,14}

CONCLUSION

There was a high adherence of the Nursing team to the protocol of prevention of urinary tract infection demonstrated by the low infection rate and conformities in relation to preventive actions according to the checking of the hygiene condition, identification,

fixation and location of the bladder delay probe.

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Anghinoni TH, Contrin LM, Beccaria LM et al.

Adesão ao protocolo de prevenção de infecção...

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