

Use of indwelling bladder catheters in an intensive care unit: cross-sectional study

Uso do cateter vesical de demora em uma unidade de terapia intensiva: estudo transversal

El uso del catéter vesical de larga duración en una unidad de cuidados intensivos: estudio transversal

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ABSTRACT

Objective: to analyze the use of indwelling bladder catheters in an intensive care unit. **Method:** this descriptive, cross-sectional, documentary study was conducted in an intensive care unit in Rio de Janeiro, between May and August 2020 with a convenience sample, comprising 190 medical records of patients with such devices. A questionnaire was used to characterize the patients, insertion criteria, best practices and non-infectious complications. The data were analyzed by descriptive statistics, presented in absolute and relative frequencies. For non-infectious events, Fischer's Exact Test was performed using the Statistical Package for Social Sciences. **Results:** indwelling bladder catheters were inserted mostly in females (123; 64.7%), patients with mean age 62.9 years, and diagnosis of COVID 19 (97; 51.1%). In 134 (70.5%) of cases, the criteria were met. **Conclusion:** the findings underline the importance of compliance with protocols and good practices when using indwelling bladder catheters.

Descriptors: Urinary Catheterization; intensive care units; Nursing Care; Urinary Catheterization; Patient Safety.

RESUMO

Objetivo: analisar o uso de cateter vesical de demora em unidade de terapia intensiva. **Método:** estudo observacional, transversal, descritivo, documental, realizado em uma unidade de terapia intensiva no Rio de Janeiro, entre maio e agosto de 2020. Amostra por conveniência, composta por 190 prontuários de pacientes com esse dispositivo. Utilizou-se questionário relacionado à caracterização dos pacientes, critérios de inserção; boas práticas; complicações não infecciosas. Os dados foram analisados pela estatística descritiva, apresentados em frequência absoluta e relativa. Para eventos não infecciosos, foi realizado o Teste Exato de Fischer, com auxílio do programa *Statistical Package for Social Sciences*. **Resultados:** a inserção de cateter vesical de demora se deu majoritariamente no sexo feminino (123-64,7%), pacientes com média de 62,9 anos e diagnóstico de COVID 19 (97 - 51,1%). Em 134 (70,5%) dos casos, os critérios foram atendidos. **Conclusão:** reforça-se a importância do cumprimento de protocolos e boas práticas no uso do cateter vesical de demora.

Descritores: Unidades de Terapia intensiva; Cuidados de Enfermagem; Cateterismo Urinário; Segurança do Paciente.

RESUMEN

Objetivo: analizar el uso del catéter vesical de larga duración en una unidad de cuidados intensivos. **Método:** estudio observacional, transversal, descriptivo, documental, realizado en una unidad de cuidados intensivos en Río de Janeiro, entre mayo y agosto de 2020. Muestra de conveniencia, compuesta por 190 historias clínicas de pacientes con este dispositivo. Se utilizó un cuestionario relacionado con la caracterización de los pacientes, criterios de inserción; buenas prácticas; complicaciones no infecciosas. Los datos fueron analizados por estadística descriptiva, presentados en frecuencia absoluta y relativa. Para los eventos no infecciosos, se realizó la Prueba Exacta de Fischer, con la ayuda del programa *Statistical Package for Social Sciences*. **Resultados:** la inserción de catéter vesical de larga duración se produjo principalmente en mujeres (123-64,7%), pacientes con media de edad de 62,9 años y diagnóstico de COVID 19 (97 - 51,1%). En 134 (70,5%) de los casos, se cumplieron los criterios. **Conclusión:** Se refuerza la importancia del cumplimiento de protocolos y buenas prácticas en el uso del catéter vesical de larga duración.

Descriptores: Unidades de Cuidados Intensivos; Atención de Enfermería; Cateterismo Urinario; Seguridad del Paciente.

INTRODUCTION

In the Intensive Care Unit (ICU), especially due to the patients' hemodynamic instability, use of vasoactive drugs and the strict need to control diuresis, urinary catheterization is a common procedure¹.

A study with 433 patients admitted to an ICU showed that 93.3% used indwelling urinary catheters (IDCs) for more than 24 hours². Another study, also in an ICU, evidenced their insertion in 86.74% of the patients³.

Although indicated in specific cases, insertion and maintenance of this medical device poses risks and infectious and non-infectious complications, such as catheter-associated urinary tract infections (CAUTIs) and urethral trauma⁴.

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Data from the Patient Safety and Quality in Health Services Bulletin No. 22 published in 2020, which analyzed the National Indicators of Healthcare-Associated Infection (HAI) and Antimicrobial Resistance (AR) for 2019, indicate that there are 3.6 cases of CAUTIs per 1,000 days of urinary catheter use in Brazil⁵.

On the other hand, there can be urethral trauma due to improper insertion of the catheter or by friction of a poorly-lubricated catheter, resulting in other complications, such as urethrorrhagia and CAUTI⁶.

Thus, with a view to preventing the complications related to the use of IDCs in Brazil, it is recommended to follow the criteria for their use, namely: impossibility of spontaneous urination, hemodynamic instability requiring monitoring of urine output, postoperative period of non-urolurgical surgeries up to 24 hours, specific urological surgeries, and presence of stage 4 pressure injury (PI) in female patients with urinary incontinence⁷.

In this sense, it becomes relevant to investigate the use of the device, enabling interventions in aspects that may be weaker and, thus, propose strategies for the safe use of this device and a reduction in the rates of related complications.

Given the above, the objective of this study was: To analyze the use of indwelling urinary catheters in critically-ill patients in an intensive care unit.

LITERATURE REVIEW

Nursing care with the use of IDC involves well-defined recommendations regarding its indication, good practices during device installation and maintenance, and early removal⁷⁻⁹.

During the insertion procedure, non-infectious complications may occur, such as urethral trauma, pain and false passage⁶. Occasionally, they may be accompanied by significant urethrorrhagia. In addition to that, after 72 hours of catheterization, the risks of CAUTI increase¹⁰.

Approximately 17% to 69% of the CAUTIs can be prevented based on good practice recommendations seeking to reduce the rate of complications due to the use of IDCs⁸, such as hand hygiene, strict insertion technique, maintenance and the way in which the catheter is removed¹¹.

According to the Centers for Disease Control and Prevention (CDC), their use can reach from 15% to 25% of the hospitalized patients, being indicated according to the patient's clinical conditions, with permanence time evaluated daily, as needed^{8,12}.

It is noteworthy that the recommendations of the Institute for Healthcare Improvement (IHI) for urinary catheterization are related to the need to monitor urine output in critically-ill patients, patients with acute urinary retention or obstruction and specific surgical procedures, to assist in PI healing in incontinent patients or in end-of-life care for the patient's comfort¹³, according to ANVISA's recommendations⁷. The catheter must be introduced by the nurse, using an aseptic technique, and it is important to inform the team about the handling and care of this device¹⁴.

The precautions include hand hygiene at all times when handling the system or the insertion site; routine hygiene of the urinary meatus; keeping the collection bag below the bladder level; emptying the collection bag regularly; use of the individual collector, avoiding contact of the drainage tube with the collecting container; and exchange of the entire system in case of disconnection, breach in the aseptic technique or leakage¹⁵.

Fixation of this device prevents urethral trauma, with fixation on the lower surface of the thigh being indicated in women and, in men, on the lower part of the abdomen¹⁶. Another relevant measure is identifying the urine collection bag, as it contributes to controlling use of the device¹⁷.

In addition to the aforementioned actions, the implementation of quality and safety processes is recommended as a guarantee of good practices, such as the use of an insertion and maintenance bundle, including standardization of the care protocol related to the use of the IDC and its indicators¹⁸.

It is also worth mentioning awareness raising in the Nursing team, such as providing continuing education for these professionals on the care of the IDC, for the prevention of HAIs and other complications¹⁸.

METHOD

An observational study with a cross-sectional, descriptive and documentary design, following the twenty-two items of the STROBE method¹⁹, and carried out from May to August 2020 in a general ICU for adults at a university hospital in the municipality of Rio de Janeiro.

The sample was for convenience, made up by 190 patients hospitalized in the researched unit, while the study was conducted.

The study included all patients using IDCs, installed before admission or during their stay in the researched unit, with hospitalization time in the ICU longer than 24 hours. Therefore, no exclusion criteria were considered among the patients using IDCs.

The data were collected from information recorded in the patients' medical charts, through a form prepared according to ANVISA's recommendations⁷ regarding the use of IDCs. The variables investigated were related to: a) the patients' characteristics, including diagnosis, gender, age and use of medications (anticoagulants, antimicrobials, diuretics and vasoactive amines); b) IDC insertion criteria such as impossibility of spontaneous urination, hemodynamic instability with need to monitor urine output, postoperative period up to 24 hours, urological surgery, female gender in the treatment of stage 4 pressure injury with healing impaired by urine; c) good practices related to catheter insertion and maintenance, such as catheter fixation, registration of the the IDC insertion and removal date; and d) non-infectious events related to the use of IDCs, with investigation of the presence of clots in the collection bag circuit, presence of lumps and injury related to the device.

The data related to the patients' characteristics and to the IDC insertion criteria were analyzed using descriptive statistics, being expressed as absolute and relative frequencies. For the analysis of the non-infectious events, Fisher's Exact Test was performed, calculated with the aid of the *Statistical Package for Social Sciences* (SPSS), version 20.0, for the association of the use of anticoagulants and catheter fixation with the non-infectious complications presented by the patients.

The study was approved by the institution's Research Ethics Committee on March 30th, 2020, under opinion number 4,283,055.

RESULTS AND DISCUSSION

A total of 190 medical records were analyzed, with COVID-19 diagnosis confirmed in 97 (51.1%) cases. Considering the period of the SARS-CoV-2 virus pandemic, the ICU where the research was carried out became a cohort unit for patients with suspicion or diagnosis of the disease, corresponding to an environment for the treatment of critically-ill patients, as it has technological resources, ventilatory support and trained professionals. Data from a study indicated that oxygen therapy was necessary in 44.4% of the patients hospitalized with COVID-19, and that 23.6% needed mechanical ventilation, requiring ICU admission²⁰.

Among the patients who used IDCs, there was predominance of females (n=123; 64.7%); the mean age was 62.9 (± 14.83) years old, varying between 29 and 95 years old, corroborating other studies in the which ICU admissions are prevalent in the population aged over 60 years old^{21,22}. This data is also related to the aging process in Brazil and to studies on the epidemiology of COVID-19, which showed a prevalence of age equal to 60 years old among the patients affected by the coronavirus^{23,24}.

As for the correct indication for the use of IDCs in relation to the insertion criteria recommended in the literature⁷, they were met in 134 (70.5%) of the investigated situations. In 92 (48.4%) of the cases, the patients met three criteria; in 27 (14.2%), they met two; and, in 15 (7.9%), they met one, which is in agreement with a study which states that, at some point during the ICU stay, the use of IDCs occurs in approximately 12% to 16% of the patients hospitalized in this unit²⁵.

Table 1 presents the distribution of the IDC insertion criteria found in this study.

TABLE 1: Distribution of the IDC insertion criteria, as recommended by ANVISA (n=190). Rio de Janeiro, RJ, Brasil, 2020.

Variables	n	%
Impossibility of spontaneous urination		
Yes	116	61.1
No	74	38.9
Hemodynamic instability with need to monitor urinary output		
Yes	1	0.5
No	189	99.5
Urological surgery		
Yes	-	-
No	190	100
Female patient with grade IV PI		
Yes	-	-
No	190	100

As for the impossibility of spontaneous urination, a research study showed that 6.4% of the hospitalized patients had this criterion for IDC insertion²⁶, contrasting with the results of this study (n=116; 61.1%). This result can be understood because the ICU is intended for critically-ill patients who need sedation and analgesia to promote comfort during the treatment^{27,28}.

Hemodynamic instability was a criterion for the use of IDCs (n=116; 61.1%). In a research study conducted with patients affected by the new coronavirus, 26% required admission to an ICU due to disease aggravation²⁹. Considering that the researched unit was a cohort during data collection, it can be understood that the criteria for the use of IDCs related to postoperative period up to 24 hours and to the urological surgery postoperative period were not expressive.

With respect to the indication for the use of IDCs in female patients with stage 4 PI, although a number of research studies show that, in the ICU, patients are at high risk for developing PI³⁰, the data showed that this criterion was not present, as in others studies^{31,32}.

Considering the frequency with which bladder catheterization is performed in this environment and the potential for preventing CAUTI, a discussion among the multidisciplinary team members regarding the risks and benefits of the bladder catheterization procedure is necessary, with daily assessment of the need for its permanence. In situations of incontinence and hemodynamic stability, urinary retention can be handled in other ways. Performing the procedure to avoid constant changes of bedding and diapers and to alleviate the team's work and care at the bedside does not justify permanence of the IDC.

In their daily visits, nurses should include systematic verification of the criteria to which the patients under their responsibility are subjected, discuss and record the justification for keeping the urinary catheter, seeking viable alternatives for comfort and with a lower risk of infection.

In addition to that, measures such as choosing the ideal catheter, insertion skill, ensuring correct fixation, avoiding excessive weight in the drainage bag and preventing accidental removal or traction, are also important in preventing complications related to indwelling bladder catheterization¹⁸.

Although correct identification of the collection bag is recommended¹⁷, there were 12 (6.3%) records of the IDC insertion dates, in contrast to a study that showed 96.2% compliance with this practice³³.

Another good practice is device fixation, which, despite being a simple procedure, its applicability is rarely performed in the daily care practice, and should be performed to avoid traction of the device^{34,35}. Ten (5.3%) devices were fixed, corroborating results of a research study that showed lower compliance related to fixation³⁴. This measure contributes to the prevention of urethral trauma, reflux and risk of CAUTI.

As for the complications, there was presence of lumps in the catheter (n=44; 23.2%), urethral injury (n=14; 7.4%), presence of clots in the circuit (n=8; 4.2%) and device-related injury (n=1; 1.1%) (Table 2).

Table 2: Non-infectious events related to the use of IDCs (n=190). Rio de Janeiro, RJ, Brasil, 2020.

Non-infectious events	n	%
Presence of lumps in the catheter circuit		
Yes	44	23.2
No	146	76.8
Urethral injury		
Yes	14	7.4
No	176	92.6
Presence of clots in the catheter circuit		
Yes	8	4.2
No	182	95.8
Injury related to device fixation		
Yes	2	1.1
No	188	98.9

Although presence of lumps or clots in the IDC circuit was found, there was no impairment of urinary flow. It is important to highlight that catheter obstruction can lead to urinary retention, creating a favorable environment for the proliferation of microorganisms³⁶.

As for the urethral injuries, all of them occurred in male patients, showing the need for bundle follow-up and discussion of indicators related to the use of IDCs, such as performance of good practices in device maintenance.

Table 3 shows data related to the use of medications by the patients using IDCs.

TABLE 3: Distribution of the sample according to use of medications (n=190). Rio de Janeiro, RJ, Brasil, 2020.

Medications	n	%
Anticoagulants		
Yes	154	81.1
No	36	18.9
Antimicrobials		
Yes	142	74.7
No	48	25.3
Vasoactive amines		
Yes	111	58.4
No	79	41.6
Diuretics		
Yes	34	17.8
No	156	82.2

The patients used anticoagulants (n=154; 81.1%), antimicrobials (n=142; 74.7%), vasoactive amines (n=111; 58.4%) and diuretics (n=34; 7.8%).

As for the use of anticoagulants, the data are justified as they are used to prevent deep thrombosis, a common complication in patients who remain bedridden for a long time, as is the case of critically-ill patients³⁷.

In relation to the antimicrobials, the use of these medications is justified due to clinical severity, invasive procedures and frequent exposure to microorganisms³⁸. However, the irrational use of this type of medications cannot be overlooked, increasing the patient's vulnerability to HAIs.

The use of vasoactive amines (n=111; 58.4%) in ICU patients can be understood by the presence of complications related to hemodynamic instability. However, its use can lead to decreased renal blood flow, thus altering urinary volume. In this sense, the use of IDCs is justified by the need for a strict diuresis control¹.

As for the diuretics, their use occurs, above all, when, in view of the administration of intravenous therapy, there is risk of fluid overload, hindering treatment. The results showed that they were little used in the patients with IDCs, in contrast to data from a research study, in which diuretics were used by 49% of the patients³⁹.

When investigating the association between presence of clots and use of anticoagulants, no statistical significance was identified (p=0.648), which was also the case when associating catheter fixation with presence of device-related injury (p=0.103) (Tables 4 and 5).

TABLE 4: Association of use of anticoagulants and presence of clots in the urine collection bag circuit (n=190). Rio de Janeiro, RJ, Brasil, 2020.

Presence of clots in the collection bag circuit							
Use of anticoagulants	Yes		No		Total		p*
	n	%	n	%	n	%	
Yes	6	75.0	148	81.3	154	81.1	0.648
No	2	25.0	34	18.7	36	18.9	
Total	8	100.0	182	100.0	190	100.0	

* Fisher's Exact Test considering a significance level of 0.05

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