USE OF PORTABLE ULTRASOUND TO DETECT URINARY RETENTION BY NURSES IN ANESTHESIA RECOVERY

Uso do ultrassom portátil para detecção de retenção urinária por enfermeiros na recuperação anestésica

Uso del ultrasom portátil para detección de retención urinaria por enfermeros em la recuperación anestésica

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ABSTRACT: Objective: To assess the opinion of nurses as to the use of portable ultrasounds to detect urinary retention during patients' recovery from anesthesia. **Method:** Field research, descriptive-exploratory and quantitative study; conducted with 34 nurses from two surgical suites at a private hospital in São Paulo. A questionnaire with two parts was applied: the characterization of professionals and questions about the use of portable ultrasounds. The collection took place between May and June 2018, after complying with the recommendations of Resolution No. 466/2012. The results were described and analyzed quantitatively, using statistical techniques and presented in tables; they were evaluated individually and comparatively, horizontally and vertically. **Results:** All nurses expressed their opinion on alternatives, which showed that ultrasound technology enables the diagnose of urinary retention. The confidence and reliability levels were high and very high. Nurses stated they were satisfied with the technology and considered their use important for the autonomy of nurses. Moreover, the use of portable ultrasounds to detect urinary retention during recovery from anesthesia was said to present only advantages. As to the training, most considered the time enough and approved the presented material. The device was easy to use. **Conclusion:** Regarding recovery from anesthesia, results showed that the technology is effective in the clinical practice of nurses at the research institution. The theme is pertinent to the accomplishment of new studies and interventions for continuous improvement of nursing processes, offering greater reliability and less difficulty to handle the device.

Keywords: Nursing. Nursing care. Recovery room. Urinary retention. Ultrasonography.

RESUMO: Objetivo: Verificar a opinião dos enfermeiros em relação à utilização do ultrassom portátil para detectar retenção urinária na recuperação anestésica. **Método:** Pesquisa de campo, descritivo-exploratória, quantitativa; com 34 enfermeiros de dois blocos cirúrgicos de um hospital privado de São Paulo; aplicado questionário com duas partes: caracterização do profissional e questões sobre o uso do ultrassom portátil. A coleta deu-se entre maio e junho de 2018, após cumpridas as recomendações da Resolução nº 466/2012. Resultados descritos e analisados quantitativamente, utilizando-se técnicas estatísticas e apresentados em tabelas; avaliados individualmente e comparativamente, de forma horizontal e vertical. **Resultados:** Todos os enfermeiros opinaram em alternativas que demonstraram que a tecnologia do ultrassom é facilitadora no diagnóstico da retenção; o grau de confiança e segurança constatado foi alto e muito alto; se mostraram satisfeitos com a tecnologia; consideraram importante seu uso para autonomia do enfermeiro e opinaram que o uso do ultrassom portátil para detecção de retenção urinária na recuperação anestésica só apresentou vantagens. Em relação ao treinamento, a maioria considerou que o tempo foi suficiente, se mostrou satisfeita com os materiais apresentados e teve facilidade em usar o dispositivo. **Conclusão:** Os resultados demonstraram que a tecnologia é eficaz na prática clínica dos enfermeiros da recuperação anestésica da instituição pesquisada. O tema é pertinente à realização de novos trabalhos e intervenções para melhoria contínua dos processos de enfermagem, oferecendo maior segurança e menor dificuldade no manuseio do dispositivo.

Palavras-chave: Enfermagem. Cuidados de enfermagem. Sala de recuperação. Retenção urinária. Ultrassonografia.

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RESUMEN: Objetivo: Verificar la opinión de los enfermeros em relación a la utilización del ultrasonido portátil para detectar retención urinaria em la recuperación anestésica. **Método:** Investigación de campo, descriptivo-exploratoria, cuantitativa; con 34 enfermeros de dos bloques quirúrgicos de un hospital privado de São Paulo; aplicado cuestionario con dos partes: caracterización del profesional y cuestiones sobre el uso del ultrasonido portátil. La recolección se dio entre mayo y junio de 2018, después de cumplidas las recomendaciones de la Resolución 466/2012. Resultados descritos y analizados cuantitativamente, utilizando técnicas estadísticas y presentadas en tablas; evaluados individualmente y comparativamente, de forma horizontal y vertical. **Resultados:** Todos los enfermeros opinaron em alternativas que demostraron que la tecnología del ultrasonido es facilitadora en el diagnóstico de la retención; el grado de confianza y seguridad constatado fue alto y muy alto; se mostraron satisfechos con la tecnología; consideraron importante su uso para autonomía del enfermero y opinaron que el uso del ultrasonido portátil para detección de retención urinaria em la recuperación anestésica sólo presentó ventajas. Em cuanto al entrenamiento, la mayoría consideró que el tiempo fue suficiente, se mostró satisfecha con los materiales presentados y tuvo facilidad em usar el dispositivo. **Conclusión:** Los resultados demostraron que la tecnología es eficaz em la práctica clínica de los enfermeros de la recuperación anestésica de la institución investigada. El tema es pertinente a la realización de nuevos trabajos e intervenciones para la mejora continua de los procesos de enfermería, ofreciendo mayor seguridad y menor dificultad em el manejo del dispositivo.

Palabras clave: Enfermería. Atención de enfermería. Sala de recuperación. Retención urinaria. Ultrasonografía.

INTRODUCTION

Urinary retention (UR) can be defined as the spontaneous, partial or total inability of the bladder to eliminate the urine produced by the kidneys. Distended, tense and painful bladder sensation and unsatisfactory urination characterize acute UR[1]. In more severe cases of UR, there may be loss of secondary bladder tone or excessive stretching of the detrusor muscle fibers, leading to bladder hypotonicity, urinary tract infections (UTIs), and even to the formation of kidney stones[2].

In view of the UR, nurses are responsible for evaluating the patient's clinical data for the correct diagnosis and, consequently, for proposing appropriate nursing interventions. Thus, they identify UR, describe its defining characteristics and related factors, and develop appropriate care actions[2-4].

For clinical evaluation of patients with UR, data collection from the clinical history is performed or, as in the case of surgical patients, assessment of postoperative and post-anesthetic conditions, and physical examination of the bladder[2,3].

The physical examination of the bladder is based on inspection, palpation and percussion, which can identify changes in organ texture, thickness, consistency, sensitivity, volume and hardness[1-3].

Thus, it is a complex procedure, since it involves the subjectivity of the examiner and the changes in the conditions of patients that directly interfere with the evaluation process, such as drug use and patients' age[1,4].

Unlike conventional imaging techniques, such as conventional radiography, computed tomography, magnetic resonance imaging, and scintigraphy and ultrasonography, traditional physical examination does not allow visualizing under the patient's skin[5,6].

Among imaging methods, ultrasound is the most accepted one, because it does not use ionizing radiation, it is not invasive, it allows dynamic studies and the orientation of procedures. That is why this method has a great potential for being incorporated into the clinical practice and serves as an extension to physical examinations[5,6].

The most common nursing intervention in UR cases is urinary catheterization[3,4], which aims to reduce the risks of mechanical and infectious complications, pain and discomfort. Despite that, much has been questioned about the use of intermittent catheterization or delay in events of postoperative UR[3].

The risk involved in patients undergoing urinary catheterization recently led the Brazilian Federal Nursing Council (*Conselho Federal de Enfermagem* - COFEn) to recommend that the insertion of urinary catheters is a specific function of nurses[7].

The etiology of postoperative UR is related to the use of anticholinergic or analgesic drugs, the type of surgery, intravenous therapy, the positioning and loss of patient privacy during urination[8-10].

In the physiology of UR, opioids increase the tone and amplitude of urinary sphincter contractions and decrease contractions of the ureter, hindering spontaneous urination[8-10].

Portable bladder ultrasounds are a non-invasive method that allows professionals to safely and reliably diagnose UR, assess the volume of urine in the bladder and decide whether or not to perform urinary catheterization[11].

Such equipment provides a quick and accurate assessment of the volume of urine in the bladder and helps in the diagnosis and management of UR. Catheterization is recommended when the volume of the bladder exceeds 600 mL, in order to avoid negative sequelae of prolonged bladder distension[11].

Because it is an unusual equipment in the practice of nursing care, theoretical-practical training is needed to access all resources of the device. A scientific basis to understand the need for its use and the appropriate time for it are of utmost importance.

In order to improve the quality of training and nursing care in anesthesia recovery (AR), preventing complications in surgical patients, the perception of nurses using ultrasound technology to assess UR in immediate postoperative patients was studied.

OBJECTIVE

To assess the opinion of nurses as to the use of portable ultrasounds to detect UR in patients admitted to AR.

METHOD

Field research, descriptive-exploratory study, with quantitative analysis. Data collection was performed in a large private hospital (with more than 700 active beds), in the south region of São Paulo, which has two surgical wings (SW): one consisting of 21 operating rooms (OR) and 30 beds of AR; and another with 14 OR and 10 beds of AR. An average of 3,000 anesthetic-surgical procedures are performed per month in both SW.

The sample consisted of 34 nursing assistants from both SW, who work in the surgery center (SC) and at AR. They all complied with the inclusion criteria, which was calculated by a population of 36 nurses, composed of all nurses from the SW. The sample was calculated considering a confidence interval of 99% and a margin of error of 3%.

Inclusion criteria were: to have already taken specific training to handle portable ultrasounds; to provide direct care to surgical patients in AR; to be present at the SW during data collection; to consent to be part of the research and to sign the Informed Consent. Exclusion criteria were: nurses on vacation or leave in the period of data collection.

The first training to handle portable ultrasounds for nurses working at AR was performed by a nurse specialist in severe condition patients, who is a reference in patients with ITU of the study's host institution, in January 2016. The training was theoretical and practical and lasted 2 hours, during which the following items were addressed: assessing the shape and location of the bladder; identifying pathologies and the consequences of UR; quantifying urinary volume using the ultrasound and how to proceed given such findings. A flow protocol was created for patients with suspected UR, in which nurses should act based on guidelines on whether to use ultrasounds or not, and how to behave considering the study's findings. Only 20 nurses were trained in this first stage. From then on, a full-time nurse, from one of the SW, became responsible for training nurses of both SW.

This training is carried out using the institution's portable ultrasound (by Sonosite) of the AR of the institution and, at the end of the course, a practical test is applied for evaluation. This test consists of performing ultrasounds, one nurse at the other, with their bladders full.

The authors created a two-part instrument for data collection: a sample characterization and a questionnaire with specific questions about the use of portable ultrasounds to detect UR in AR patients.

Data collection was carried out between May and June 2018, after approval of the research project by the Research Ethics Committee of the study institution, via *Plataforma Brasil* (CAAE 81442917.8.0000.0071), with the approval of the nurse manager of both SW.

Data was collected by the first researcher, through the application of the questionnaire to the nurses of both SW, which were individually addressed. All information was recorded in the instrument, which was immediately delivered to the researcher, along with the Informed Consent in two copies, one of the participant's and the other of the researcher's.

The data obtained was treated statistically, using descriptive statistics, besides the hypothesis test for sample calculation. To present the results, tables with absolute numbers and percentages were constructed, analyzed individually and comparatively, and horizontally and vertically.

RESULTS

Thirty-four nurses from both SW who worked at AR participated in the study. The characterization of professionals is presented in Table 1.

The questionnaire applied to the nurses of both SW presents the first seven questions regarding their opinion on the use of portable ultrasounds in AR to detect UR, taking into account factors such as: the importance of the technology, methods used to detect retention and which are considered more effective, and the confidence level and autonomy of nurses to handle the device. Results are shown in Table 2.

None of the alternatives in the questionnaire of the first seven questions showed dissatisfaction and/or little importance regarding the use of ultrasounds.

The last four questions of the instrument were applied to evaluate the satisfaction of nurses as to the training received, considering the theoretical material, the training period and the problems to handle/interpret the device. Results are shown in Table 3.

Table 1. Characterization of nurses, according to gender, age, training period, working period and field of action.

Variables	Nurses (n=34)	
	n	%
Gender		
Female	26	76.47
Male	8	23.53
Age range (years)		
25 to 34	9	26.47
35 to 44	17	50.00
45 to 54	5	14.71
55 to 64	3	8.82
Training period (years)		
1 to 5	7	20.59
6 to 10	19	55.88
11 to 15	5	14.71
16 to 20	1	2.94
21 to 25	2	5.88
Working period (years)		
1 to 5	12	35.29
6 to 10	17	50.00
11 to 15	2	5.88
16 to 20	1	2.94
21 to 25	2	5.88
Field of action		
AR 1	18	52.94
AR 2	16	47.06
Total	34	100

AR: anesthesia recovery.

Regarding the difficulty to handle the device, cross-analyzes were performed, presented in Tables 4 and 5.

In a horizontal analysis (Table 4), it is observed that, of all nurses who answered whether the theoretical content was enough to handle the device, only 21.74% of them classified its difficulty as average, whereas the rest of them (78.26%) rated it as easy. Nurses who did not receive theoretical content classified interpretation as mean and difficult; and 80% of nurses who said there was little theoretical-scientific content evaluated the equipment as difficult to handle.

In a vertical analysis (Table 5), of all nurses who had problems to handle/ interpret the device, 60% were in the age range from 35 to 44, whereas nurses aged from 55 to 64 reported no difficulties.

When asked about the training to use the device, given during the classes of the Nursing Graduate Course in SC and at AR, 20 nurses found it a good practice and 14 reported it was great and necessary.

At the end of the questionnaire, a dissertation question was applied to collect suggestions, in which some professionals expressed the following: "All nurses should be trained; this will guarantee quality care and avoid unnecessary invasive procedures"; "Unfortunately, not all hospitals have this technology available for professional nurses to use"; "Periodic training should be performed".

DISCUSSION

The use of portable ultrasounds as instruments to assess the urinary volume of patients in the immediate postoperative phase (IPP), hospitalized in AR, was a very reliable and used method, according to the opinion of the 34 nurses from this study. According to the data obtained in the questionnaire, no nurse was against the use of such device. Quite to the contrary, they considered that this technology facilitates the process of identifying UR and found no disadvantages in its use in the field. Thus, 67.65% performed physical examinations using the device to detect UR, whereas the other 32.35% used the device only for evaluation.

Results show the comprehension of nurses who work at AR as to the importance of patient evaluation in IPP, still in the unit, and how complex the UR evaluation procedure is, which involves clinical and anesthetic signs and symptoms that lead to different degrees of reliability, often leading to invasive treatment such as urinary catheterization.

Table 2. The opinion of nurses on the use of portable ultrasound to detect urinary retention during patients' recovery from anesthesia.

Questions (1 to 7)	Nurses (n=34)	
	n	%
1. Method used to detect UR		
Physical examination + use of the portable ultrasound	23	67.65
Use of the portable ultrasound	11	32.35
2. Method considered the most effective to detect UR in AR		
Physical examination + use of the portable ultrasound	17	50
Use of the portable ultrasound	17	50
3. Facilitating technology in the diagnosis and treatment of UR in AR		
Yes	34	100
4. Confidence/reliability levels when detecting a condition of UR by using the portable ultrasound		
High	9	26.47
Very high	25	73.53
5. Satisfaction with the portable ultrasound technology in AR		
Extremely satisfied	26	76.47
Satisfied	8	23.53
6. UR events in patients in the IPP in HU decreased with the use of portable ultrasounds		
Yes	34	100
7. Importance of this technology for the autonomy of nurses who work at AR		
High	7	20.59
Very high	27	79.41
Total	34	100.00

UR: urinary retention; AR: anesthesia recovery; IPP: immediate postoperative phase; HU: hospitalization unit.

Table 3. The opinion of nurses on their training and difficulties in handling the portable ultrasound device.

Questions	Nurses (n=34)	
	n	%
8.1 Satisfaction with the training period to handle the portable bladder ultrasound		
Little time	8	23.53
Enough time	26	76.47
8.2 Satisfaction with the presented material to handle the portable bladder ultrasound		
Theoretical-scientific content was enough for learning	23	67.65
Did not receive theoretical content	6	17.65
Little theoretical-scientific content	5	14.71
9. Classification regarding difficulties in handling/interpreting the device		
Difficult	5	14.71
Easy	18	52.94
Medium	11	32.35
10. Opinion on the training being given during the classes of the Nursing Graduate Course in the SC and at AR		
Good	20	58.82
Great and necessary	14	41.18
11. Are there more advantages or disadvantages as to the use of the portable ultrasound in AR?		
Advantages	34	100
Total	34	100

SC: surgery center; AR: anesthesia recovery.

Table 4. Relation between the classification of problems in handling the portable ultrasound *versus* satisfaction with the available material for training.

8.2 Satisfaction with the presented material to handle the portable ultrasound	9. Classification as to the difficulties to handle/interpret such equipment (%)			
	Difficult	Easy	Medium	Total
Theoretical-scientific content was enough for learning	-	78.26	21.74	100
Did not receive theoretical content	16.67	-	83.33	100
Little theoretical-scientific content	80.00	-	20.00	100
Total	14.71	52.94	32.35	100

Table 5. Relation between the classification of difficulties in handling the portable ultrasound *versus* age range.

Age range (years)	9. Classification as to the difficulties to handle/interpret such equipment (%)			
	Difficult	Easy	Medium	Total
25 to 34	20	44.44	-	26.47
35 to 44	60	22.22	90.91	50.00
45 to 54	20	22.22	-	14.71
55 to 64	-	11.11	9.09	8.82
Total	100	100	100	100

Such intervention should not be performed without careful evaluation to safely diagnose UR, due to the high risk of trauma and infections, which has economic repercussions, can cause sequelae, complications and the possibility of damage to patients[1-4].

The use of ultrasound eliminates unnecessary catheterization, which leads to a strong impact on reducing UTI rates and decreasing hospitalization time[1-3]. In addition, the use of portable ultrasounds results in low cost and high benefits, given there is a small initial investment to buy equipment and reduce urinary catheterization. It also reduces nurse's working periods and expenditures on material resources to perform the procedure[1-3,11,12].

All nurses participating in the study considered that, with the use of the ultrasound in AR, the occurrence of UR events decreased in the hospitalization unit (HU). Thus, all these advantages are onset still in the SW, resulting in less exposure and embarrassment to patients in HU, especially in orthopedic surgeries and/or spinal anesthesia, in which there is a temporary impairment of sensitivity of the pelvic region and, often, patients present significant urinary leakage. The relevance of early identification of bladder distension lies in the fact that prolonged overdistension of the bladder can cause damage to the detrusor muscle and bladder dysfunction[2].

Equipment's reliability has been verified using the proximity between the measurement of the urine volume estimated in the bladder by the piece of equipment and the urine volume measured after emptying the bladder with catheterization. The difference found was only of 15 mL between volumes. Thus, the use of ultrasonography was proven to be an effective method that overcomes a clinical examination palpating the bladder[13].

In this study, professionals stated a high confidence level when detecting UR via ultrasonography. Studies present sensitivity data of 97%, specificity of 91% and accuracy of 94% in the identification of urine volumes greater than or equal to 100 mL, through ultrasonography[13].

Considering the clinical repercussions that non-diagnosed UR can have and the benefits that ultrasonography has to this end, a systematic evaluation of patients' bladder contents at the time of admission and discharge from AR is suggested, especially in those where a known risk factor is present[13].

As to the importance of the use of portable ultrasounds for the autonomy of nurses to detect UR, it was described

as very high or high by all nurses. Data demonstrates that the use of the device enables decision making and the initiative of professionals in face of symptoms or even circumstances that lead to UR in patients during the IPP, preventing complications and/or anticipating actions that previously depended on medical actions.

Prior to the use of this technology, nurses had to ask the responsible anesthesiologist and/or surgeon to use ultrasounds, who would then be responsible for prescribing catheterization, if needed. With the use of portable ultrasounds by trained nurses, they perform the test, quantify the volume and prescribe immediate treatment, anticipating the prevention of complications, even in AR. Thus, the benefits not only cover the nursing team and their patients, but also optimize the time of doctors, who previously had to evaluate patients and prescribe the appropriate actions to be taken.

Regarding the training received by nurses, results obtained in the last four questions showed that 76.47% considered the training period enough for learning and, consequently, handling portable ultrasounds. As to the theoretical-scientific material, six nurses (17.65%) reported not having received theoretical content, only practical, and other five nurses (14.71%) considered the presented theoretical content to be little.

Although most nurses evaluated the theoretical training period as sufficient for learning, those who did not receive the training reported having only performed the practical part, in a single moment, during their working day, when there was an opportunity.

Based on the result of the horizontal analysis of data, it is possible to say that the degree of difficulty presented by nurses is directly related to the training they received. Those who did not receive training or stated that the theoretical material was not enough, presented more difficulty when compared to those who received the training and stated the material was enough for learning.

Well-trained professionals are more confident and efficient, present better performance, lower stress, greater motivation, persistence and expectation of success[14]. The possibilities and limitations to develop new skills must be known.

A vertical analysis was performed to assess the problems nurses had to handle the device, which indicated that older professionals had less difficulty in handling portable ultrasounds.

Therefore, continuing education of health professionals should be part of the institution's culture and initiatives, providing individual and personal growth to contribute to the organization of work processes. This would allow higher quality of health care for the effective articulation of the improvement actions and the processes of care management.

CONCLUSION AND FINAL CONSIDERATIONS

The analysis of answers given by 34 nurses who worked at AR and used portable ultrasounds to detect UR help to conclude that all professionals considered that this technology facilitated the diagnosis of UR in AR. The confidence and reliability levels were high and very high in the detection of UR and professionals were extremely satisfied or satisfied with this UR technology. Its use is seen as very important or important regarding nurses' autonomy and professionals believe that the use of portable ultrasounds to detect UR in AR only has advantages. As to the training, most considered the learning time to be enough, approved the material presented, and thought the device was easy to use.

The opinion of nurses is extremely positive and shows their concern about a more accurate diagnosis for immediate treatment/actions, thus preventing complications in HU. They did not find disadvantages in the use of ultrasounds and said actions are taken according to the institutional protocol.

On the other hand, some answers about the training highlight the need for continuous recycling during the year, *in loco*, and consider that it should be carried out in Nursing Graduate courses, because it is an innovative trend/enabler, which ensures safety and reliability to the diagnosis of UR.

The result of the questionnaire applied was positive, demonstrating that the technology is effective and promising in the clinical practice of nurses who work at AR in the institution being researched. This is an incentive study for institutions that have not yet adopted the use of portable ultrasounds in AR, which helps nurses who know their advantages and benefits, demonstrated by the professionals of the same sector, to improve the quality of care provided.

It is important to emphasize that the study assessed the opinion of nurses who work at AR. Future comparisons are intended to know the opinion of nurses working at HU and highlight the impacts of ultrasounds in detecting UR, still in AR, for professionals and their patients in HU.

This study paves the way for further research and interventions to be conducted, aiming at continuously improving nursing processes and providing more safety and less problems in handling the portable ultrasound device.

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