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JORNAL BRASILEIRO de MEDICINA DE EMERGÊNCIA

Case Report

Point-of-care ultrasound praxis at the bedroom by resident nurses in the bladder residual assessment

Práxis de ultrassom point-of-care *à beira leito por enfermeiros residentes na avaliação residual vesical*

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ABSTRACT

The objective of this case report was to explain the practice of point-of-care ultrasound at the bedside by resident nurses in bladder residual assessment. Male patient, 72 years old, complaining of voiding difficulty associated with dysuria, after becoming aware of the complaint, the relief vesical catheter was placed at night with a considerable amount of urine output. On the following day, on physical examination, he presented pain on palpation in the lower belly region and presence of a vesical globe. After the physical examination and knowledge of the patient's complaints, the nurses chose to perform the point-of-care ultrasound at the bedside to assess the bladder residue. Systemic arterial hypertension was a comorbidity. Bladder. Point-of-care ultrasound revealed quantitative of 540cc by the ELIPSE formula (L x AP x T x 0.52). Thus, the present case report supports the relevance of the use of bedside ultrasound as a complementary resource to the physical examination, by the professional nurse and the importance of this tool in the differential diagnosis of urinary residual volume retention.

Keywords: Emergency nursing; Case reports; Urinary retention; Ultrasonography, interventional

RESUMO

O objetivo deste estudo foi explanar a práxis de ultrassom *point-of-care* à beira leito por enfermeiros residentes na avaliação residual vesical. Paciente do sexo masculino, 72 anos, com queixa de dificuldade miccional associada à disúria. Após o conhecimento da queixa, realizou-se a passagem do cateter vesical de alívio no período noturno, com retorno de quantidade considerável de diurese. No dia seguinte, ao exame físico, apresentou dor à palpação em região de baixo ventre e presença de globo vesical. Posterior ao exame físico e ao conhecimento das queixas do paciente, os enfermeiros optaram por realizar o ultrassom *point-of-care* à beira leito para avaliação do resíduo vesical. A hipertensão arterial sistêmica era sua única comorbidades. O ultrassom *point-of-care* de bexiga que revelou quantitativo de 540cc pela fórmula ELIPSE (L x AP x T x 0,52). O presente relato de caso sustenta a relevância do uso do ultrassom à beira leito como recurso complementar ao exame físico pelo profissional enfermeiro e a importância dessa ferramenta no diagnóstico diferencial da retenção do volume residual urinário.

Descritores: Enfermagem em emergência; Relatos de casos; Retenção urinária; Ultrassonografia de intervenção

Received on: Jul 14, 2022 • **Accepted on:** Apr 4, 2022

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Source of financing: none.

Conflicts of interest: there are no conflicts of interest.

How to cite this article: Rabito LB, Lima BD, Gonçalves TL, Flávio GG, Karino ME. Point-of-care ultrasound praxis at the bedroom by resident nurses in the bladder residual assessment. JBMEDE. 2022;3(1):e23004

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DOI: 10.54143/jbmede.v3i1.76

INTRODUCTION

Urinary retention (UR) is defined as the partial or total disability of the bladder to spontaneously empty the urine produced by the kidneys. When acute, it is quite uncomfortable, brings a feeling of pressure, tension, discomfort, pain, as well as hypersensitivity to the pubic symphysis and its inability to urinate. In chronic UR, it may be less symptomatic, with gradual dilatation of the bladder, pain may be absent, and it may also be associated with dripping caused by leakage of urine from the bladder.[1-3]

Urinary retention is a Nursing Diagnosis (ND) listed by taxonomy II proposed by NANDA 2020, being defined as the inability to completely empty the bladder. Its defining characteristics are: the absence of urine elimination; distension of the bladder; dysuria; urinary elimination in small quantities; drip; incontinence due to overflow; sensation of bladder filling; residual urine; and frequent urination.[4]

The nurse, faced with the diagnosis of UR, must perform the anamnesis and physical examination, however, these methods are influenced by the clinical conditions of the patients, which may lead to loss of precision in the ND.[5] Among the imaging technologies that assist in the verification of urinary volume, ultrasound point-of-care (POCUS) stands out as an effective method for the UR evaluation, as it does not use ionized radiation, it is not invasive, it allows dynamic studies and is performed at the bedside.[6]

Ultrasound point-of-care is an excellent tool for the diagnosis of acute UR in the appropriate clinical setting, as it allows the estimation of urinary volume and may determine bladder catheterization, as well as confirmation of the probe balloon inside it.[7]

The *Conselho Federal de Enfermagem* (Cofen) regulates, through resolution 679 of 2021, the performance of bedside ultrasonography in the pre-hospital environment by the professional nurse, being private to this professional, within the scope of the nursing team, provided that the nurse is trained for this practice.[8,9]

Thus, this study aimed to explain the practice of POCUS at the bedside by resident nurses in bladder residual assessment.

CASE REPORT

On March 31, 2022, a 72-year-old male patient, previously hypertensive, was referred via the *Serviço de Atendimento Móvel de Urgência* (SAMU) to the emergency room of a university hospital (UH) with a history of lethargy dysarthria, vertigo and increased blood pressure 5 days before its arrival. Computed tomography of the skull was performed in the service of origin, showing an intraparenchymal hemorrhage in the left cerebellum, with approximately 34 x 35 mm.

During the in-hospital evaluation, the patient presented confusion and significant memory loss. He did not remember what happened and he had no pain complaints at the time. On physical examination, he showed good general condition, stained, hydrated, eupneic, anicteric, acyanotic and afebrile, disoriented and confused, Glasgow coma scale of 14 (E4, V4, M6), dysarthria. On neurological examination, isochoric and photoreactive pupils, photomotor reflex present and preserved, I to XII cranial nerves without alterations, C6-T1 without sensory and motor alterations, L2-S1 without sensory and motor alterations, strength preserved in upper limbs and limbs lower. On general physical examination, vesicular murmurs were present bilaterally, without adventitious sounds, cardiac auscultation with normophonetic rhythmic sounds in two stages, without murmur; globous abdomen, painless on superficial and deep palpation, with hydroaerial sounds present and with the absence of visceromegalies, bexigoma or palpable masses.

Due to poor blood pressure controls, the medical team opted for nitroprusside in a continuous infusion pump to maintain desirable blood pressure (BP) (target BP < 140 x 90 mmHg).

During hospitalization, on April 4, 2022, the patient reported urinary distress associated with dysuria, after knowing the complaint, the vesical relief catheter (VRC) was passed at night with a

considerable amount of diuresis returning. On the following day, during the physical examination, he presented pain on palpation in the low belly (LB) region and the presence of a bladder globe. After the physical examination and knowledge of the patient's complaints, the nurses chose to perform the POCUS at the bedside to evaluate the vesical residue.

The evaluation is done with the patient in the supine position and to characterize the bladder, the convex transducer was used in a suprapubic approach. Initially, the transducer was positioned in the transverse plane in the uppermost aspect of the public symphysis and posteroinferior met transducer was directed, tilting the transducer until the bladder was completely visualized, proceeding with the measurement (Figure 1), obtaining the anteroposterior values equivalent to 7.72 cm (represented by line 1) and anterolateral values equivalent to 10.97 cm (represented by line 2).

Subsequently, the transducer was rotated 90° clockwise to obtain the longitudinal image, tilting the transducer, not failing to visualize its lateral walls, until obtaining the best windowing and then proceeded with the longitudinal measurement (Figure 2), obtaining a quantitative of 12.27 cm (represented by line 1).

After obtaining the measurements, the obtained values were multiplied: 7.72 (anteroposterior axis of the transverse plane) x 10,97 (anterolateral axis of the transverse plane) x 12,27 (longitudinal plane) x 0,52 (formula constant) = 540 cm.

After analyzing the amount of fluid retained, associated with the patient's complaint, physical examination findings, the patient's previous history and considering that the urinary volume above 300 cm, within the appropriate clinical context, suggests acute UR and the need for catheterization.[7] It was discussed with the medical team and the passage of the vesical catheter of delay (VCD) was considered.

After bladder catheterization with a 2-way foley tube, no. 16, an immediate return of 410 mL of choluria was obtained. Figure 3 shows the windowing of the bladder in the transverse plane of the same patient in a supine position, after the passage of the indwelling urinary catheter. It is possible to visualize the bladder with well-defined windows and the acoustic shadow produced by the bladder catheter balloon, norm positioned.

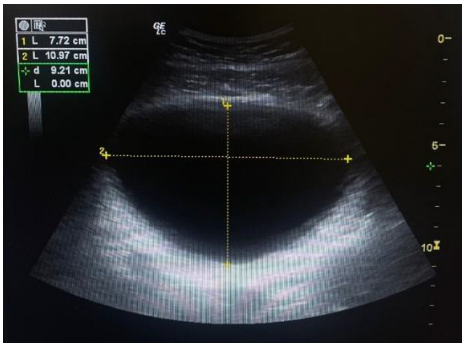

Figure 1. Evaluation and estimation of urinary bladder volume with the use of ultrasound using the convex transducer. We observe the bladder in transversal plane.

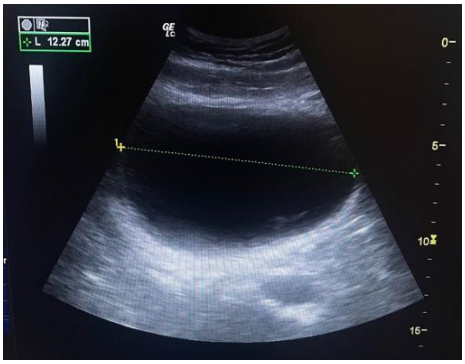

Figure 2. Evaluation and estimation of urinary bladder volume with the use of ultrasound using the convex transducer. We observe the bladder in a longitudinal plane.

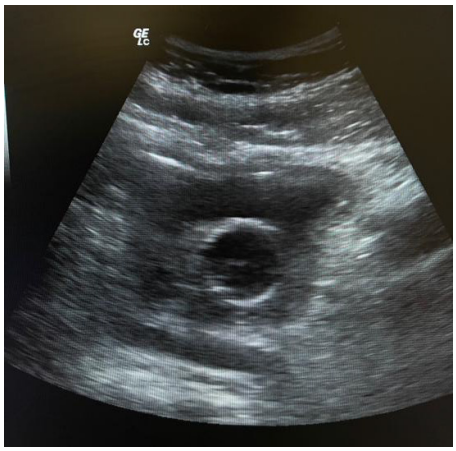

Figure 3. Evaluation of the bladder windowing with the use of ultrasound using the convex transducer. In the transverse plane image after passage of the indwelling urinary catheter, it is possible to observe the acoustic shadow produced by bladder catheter balloon.

DISCUSSION

Evidence-based practice, in nursing, is a safe and organized way to prioritize professional conduct focused on identifying and solving problems, based on the best scientific evidence. However, in order to be effectively used, it is up to the professionals to obtain, interpret and interact with the results already evidenced corroborating the clinical data of the patient associated with the use of healthy technologies.[10,11]

An integrative review study, which aimed to identify the scientific evidence present in the literature regarding the use of bladder ultrasound, evidenced that 1,928 patients, divided into two groups (group one with bladder ultrasound not available and group two with bladder ultrasound available) and the examination performed by nurses after bladder emptying, obtained as a result that the association of the use of imaging technology reduced the incidence of urinary tract infection (UTI), the time of hospitalization and complications.[12]

Another study that aimed to describe the frequency of urinary complaints, the presence of a bladder globe and the real need to perform the VRC after the use of ultrasound, concluded that the use of ultrasound by bedside nurses was more accurate to estimate the volume of diuresis when compared to the volume obtained after the VRC, emphasizing the real accuracy of the use of this technology in the detection of the UR.[13]

Although the evidence stems from the relevance of the use of bedside ultrasound in clinical practice and lists the various benefits associated with the use, among them, the reduction of unnecessary bladder catheterization, the decrease in the incidence of UTI related to the use of urinary devices, decreased length of hospital stay, expenses associated with the long period of hospitalization, praxis is still infrequent in the nurse's routine.

These factors can be justified by the lack of training and qualifications for the performance of the ultrasound at the bedside and the interpretation of the findings, the absence and availability of the ultrasound apparatus in emergency services and even the lack of interest of the professional in appropriating the technique.

Thus, the present case report supports the relevance of the use of bedside ultrasound as a complementary resource to a physical examination by nursing professionals and the importance of this in the differential diagnosis of urinary residual volume retention.

It is noted that it is indispensable to the publication of new studies that address the theme in question and the appropriation of the nursing profession about the insertion of ultrasound in daily practice.

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