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CLINICAL INFORMATION

Importance of preoperative guided ultrasound in patients with femoral fracture: case report



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KEYWORDS

Perioperative medicine;
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Abstract

Objective: The aim of this report is to represent the role of the use of bedside ultrasound by the anesthesiologist, offering an individualized approach to the specific condition of the patient, without unnecessary postponement of femur fracture surgical repair in the elderly.

Case report: Female patient, 86 years old, hypertensive, victim of trochanteric fracture of the femur, taken to the operating room after being released by cardiology service. A bedside ultrasound exam allowed the identification of aortic stenosis, left ventricular hypertrophy, carotid stenosis, and signs of hypovolemia. From these findings, it was decided to use an ultrasound-guided block of the nerves femoral and lateral cutaneous of the thigh as an anesthetic technique.

Conclusions: The use of ultrasound guidance by the anesthesiologist can provide relevant information for individualizing the anesthetic technique, without postponing the surgical intervention, which usually occurs when the patient is referred for complete examination by the specialist.

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PALAVRAS-CHAVE

Medicina perioperatória;
Anestesia;
Fratura de fêmur;
Ultrasonografia;
Ecocardiografia

Importância da ultrassonografia direcionada no pré-operatório de pacientes com fratura de fêmur: relato de caso

Resumo

Objetivo: Exemplificar o papel do emprego da ultrassonografia à beira do leito pelo anestesio- logista e oferecer uma abordagem individualizada para a condição específica do paciente, sem que haja postergação desnecessária de correções cirúrgicas de fraturas de fêmur em idosos.

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Relato do caso: Paciente feminina, 86 anos, hipertensa, vítima de fratura trocantérica de fêmur, levada ao bloco cirúrgico após liberação cardiológica. O exame ultrassonográfico à beira do leito possibilitou a identificação de estenose aórtica, hipertrofia ventricular esquerda, estenose de carótida e indícios de hipovolemia. A partir desses achados, decidiu-se pelo bloqueio nos nervos femoral e cutâneo lateral da coxa guiado pela ultrassonografia como técnica anestésica.

Conclusão: O uso da ultrassonografia direcionada à beira do leito pelo anestesiologista pode fornecer informações relevantes para a individualização da técnica anestésica, sem que haja postergação da intervenção cirúrgica, a qual comumente ocorre quando o paciente é referenciado para exame completo pelo especialista.

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Introduction

The incidence of femoral fractures in the elderly population is high and has increased every year. A very significant proportion of these patients present with important comorbidities.¹ Surgical intervention is the treatment indicated in most cases. A short time between trauma and surgery has been related to shorter hospital stay and lower rates of morbidity and mortality. Early intervention (<48 h) has been increasingly targeted as ideal.²

The aim of this report is to represent the role of the bedside ultrasound exam by anesthesiologists and to offer a personalized approach regarding the patient's specific condition, without unnecessary surgical procedure delay.

Case report

A female patient, 86 years old, 70 kg, 162 cm tall, brought to the hospital after falling from her own height without previous loss of consciousness. She had a previous history of systemic arterial hypertension, mastectomy and hysterectomy both for more than six years ago. The patient was taking amlodipine, atenolol, losartan, venlafaxine, simvastatin, clonazepam, and acetylsalicylic acid. She denied allergies and addictions.

After a trochanteric fracture of the right femur was identified by the orthopedic team the patient was evaluated by the cardiologist on duty. His was the following description of physical examination: eupnea, with normal pulmonary auscultation, cardiac auscultation evidencing holosystolic murmur, heart rate of 80 bpm, and blood pressure of 120/60 mm Hg. ECG: regular sinus rhythm, non-specific changes in ventricular repolarization. Laboratory tests (blood count, INR, aPTT, creatinine, urea, glycemia, sodium and potassium) within normal limits.

The patient reported having had echocardiography and carotid artery duplex scanning three years ago. Although she could not report the result, she said that she was oriented to maintain clinical treatment, with which she remained asymptomatic.

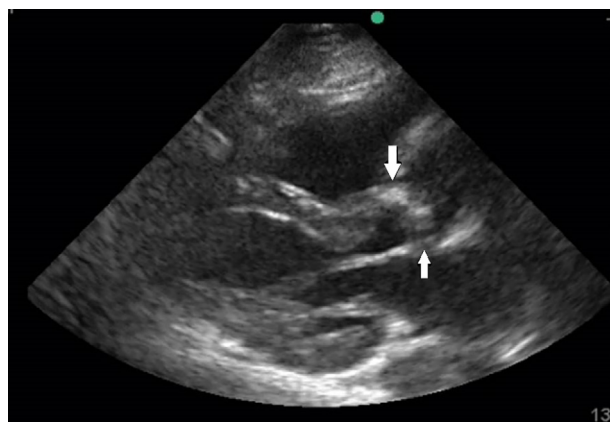


Figure 1 Parasternal long-axis window. Arrows show calcified and stenotic aortic valve.

In view of this situation, she was released for surgical procedure and taken to the surgical theater, where her medical history was reviewed without obtaining additional information.

After venoclysis with an 18G catheter, monitoring with 3-lead electrocardiogram (II, V5 and AVL), pulse oximetry and non-invasive blood pressure were performed, a transthoracic echocardiographic analysis was performed (Sonosite M turbo[®], probe P21 of 5 to 1 MHz). The windows worked were parasternal long and short axis, apical four-chamber, and subcostal. Carotid ultrasound (Sonosite M turbo[®], probe HFL 38× of 13-6 MHz) was also performed. The relevant findings were: aortic stenosis and left ventricular hypertrophy (Figs. 1 and 2), left carotid stenosis (Fig. 3), and inferior vena cava diameter reduced with inspiratory collapse (Figs. 4 and 5).

According to these findings, the technique chosen was femoral nerve block (12 mL of 0.5% ropivacaine) and lateral cutaneous nerve block of the thigh (10 mL of ropivacaine 0.5%) guided by ultrasound. Midazolam (1 mg), fentanyl (25 mcg), and ketamine (10 mg) were used for sedation. Through a small fluid replacement (200 ml of lactated Ringer), she remained hemodynamically stable without the

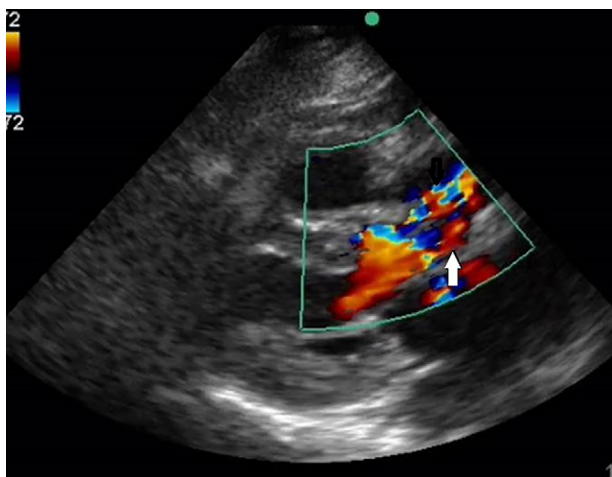


Figure 2 Parasternal long-axis window flow analysis. Arrow shows swirling flow through stented valve.

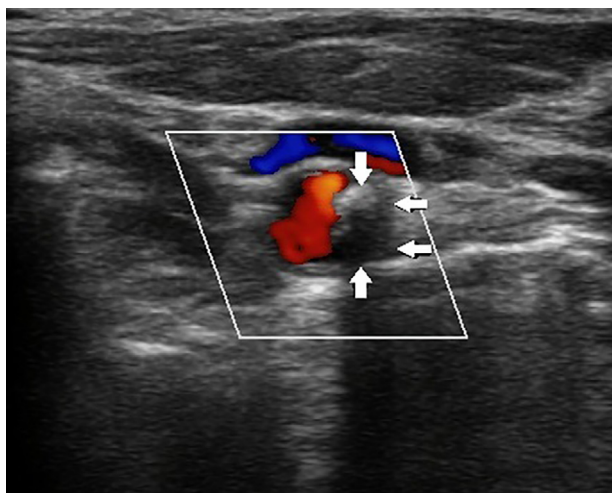


Figure 3 Left carotid transverse section. Flow analysis with arrows showing area with significant lumen obstruction.

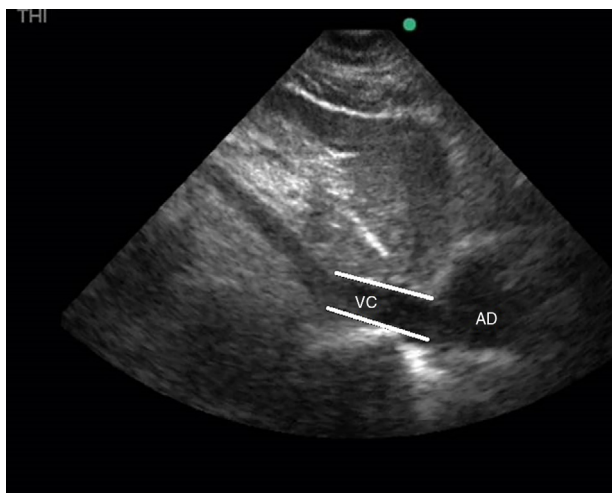


Figure 4 Subcostal expiration window. Lines show the vena cava (VC) that reaches the right atrium (AD).



Figure 5 Subcostal inspiration window. Arrows show inspiratory collapse of the inferior vena cava.

need for vasopressor administration and on spontaneous breathing. The surgical repair of the right trochanteric fracture was performed through osteosynthesis with a short cephalomedullar nail. After surgery, the patient was taken to the intensive care unit (ICU) from where she was discharged the next day. Hospital discharge occurred on the second postoperative day.

Discussion

Preoperative echocardiographic evaluation, although useful for providing important information, is related to delayed surgical intervention. Almost all patients who present for surgical treatment of femoral fractures in whom the heart murmur is auscultated have relevant echocardiographic findings, whose information provided by the examination is useful to anesthesiologists. However, almost none of these patients required any type of cardiologic preoperative intervention, either surgical or clinical. One study showed that a complete examination by the specialist was related to delayed surgical repair of fractures (mean delay of 1.6 days).³ Another study showed that while only 15.4% of patients who were referred for complete echocardiographic (ECG) examination underwent surgery before 48h, 84.7% of those not referred for ECG examination were operated within that period.⁴

It is clear that, although ideal, the complete echocardiographic examination performed by a specialist is not always available at the optimal time.⁵ At this kind of crossroads, the anesthesiologist emerges with a very important role.^{6,7} The case presented here demonstrates this clearly. The association of hypovolemia, aortic stenosis, and carotid stenosis presented by the patient had the potential, depending on the technique chosen, for various and serious complications, such as severe hemodynamic instability, coronary and/or cerebral ischemia, among others. Venous and arterial vasodilation, occurring in both neuraxial blocks and general anesthesia, associated with hypovolemia, could lead to a marked drop in blood pressure which may result in cardiac and neurological complications, especially in a patient with aortic and carotid stenosis. Therefore, a bedside ultrasound performed by the anesthesiologist

can provide relevant information for anesthetic technique individualization, drug and/or dose choice of anesthetics without surgical intervention delay, which commonly occurs when the patient is referred to any specialist for a complete examination.

Conflicts of interest

The authors declare no conflicts of interest.

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