Case Reports

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Spontaneous Lumbar Artery Rupture: Diagnostic and Therapeutic Challenges in Anticoagulated Patients

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Spontaneous rupture of the lumbar artery is a rare and potentially life-threatening complication, particularly in anticoagulated patients. Its diagnosis is challenging due to nonspecific symptoms and rapid progression. We present the case of a 78-year-old woman, without prior arterial disease, who developed atrial fibrillation during hospitalization and was started on enoxaparin (1 mg/kg every 12 hours). She subsequently developed hemodynamic instability, prompting urgent imaging. An initial ultrasound showed a right flank hematoma, and a computed tomography angiogram confirmed a retroperitoneal hematoma due to lumbar artery rupture. The patient received aggressive resuscitation and hemodynamic support, followed by successful catheter embolization, which stabilized her condition. This case highlights the importance of considering spontaneous lumbar artery rupture in anticoagulated patients presenting with unexplained hemodynamic instability. Early diagnosis and timely endovascular intervention can be life-saving and improve outcomes.

Keywords: *Spontaneous Rupture; Lumbar Artery; Anticoagulation; Retroperitoneal Hematoma; Catheter Embolization*

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INTRODUCTION

Spontaneous lumbar artery rupture (LAR) is an extremely rare clinical condition, with limited information about its incidence and underlying mechanisms. While massive retroperitoneal hematomas related to the rupture of this artery are often associated with trauma or retroperitoneal neoplasms, spontaneous rupture poses a clinical challenge due to its high morbidity and mortality and the difficulty of early and accurate diagnosis. Despite technological advances, this condition remains complex to identify [1,2].

Over the past decades, an increased incidence of this condition has been observed, likely attributable to the widespread use of anticoagulant and antiplatelet agents. Emerging evidence also suggests associations with unrecognized vascular injuries, underlying coagulopathies, and invasive procedures such as hemodialysis. These factors contribute to vascular fragility and increase the risk of spontaneous bleeding [2,3].

This case report describes a spontaneous rupture of the lumbar artery, analyzing its clinical presentation, diagnostic strategies, and therapeutic management.

Additionally, possible pharmacological interactions that could have influenced the genesis of the event are evaluated. These types of reports are crucial for improving early recognition of the pathology, optimizing interventions, and reducing associated morbidity and mortality. This is the first case reported in Latin America.

CASE DESCRIPTION

A 78-year-old female patient was admitted to the intensive care unit (ICU) after being referred from another institution due to dyspnea, mixed respiratory symptoms, and respiratory distress. Relevant personal history included chronic obstructive pulmonary disease secondary to heavy smoking (quit 10 years ago), hypertension, and venous insufficiency. The patient was functionally independent and was receiving pharmacological treatment with losartan, acetylsalicylic acid, and rescue inhaled beta-2 agonists. Initial evaluation identified a superinfection of the underlying pulmonary pathology, associated with severe hypercapnia causing

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gasometric and neurological alterations. Management was initiated with non-invasive mechanical ventilation, crisis inhaled therapy, intravenous steroids, and antibiotic therapy.

Seventy-two hours after admission, the patient developed atrial fibrillation with rapid ventricular response, for which antiarrhythmic and anticoagulant therapy was initiated to prevent embolic disease. Subsequently, 48 hours after this event, the patient developed refractory hypotension to fluid resuscitation, tachycardia, and the need for vasopressor support. Over five hours, a rapid increase in vasopressor requirements was observed, associated with an abrupt drop of 2 g/dL in hemoglobin levels. Extended physical examination revealed a non-pulsatile mass in the right abdomen accompanied by a large hematoma (Figure 1a), and the focused ultrasound (FOCUS) revealed an image suggestive of a spontaneous hematoma in the right flank and hypochondrium (Figure 1b).

A hypovolemic hemorrhagic shock protocol was activated, and two emergency red blood cell units were transfused.

Emergency angiographic computed tomography (CT) confirmed the presence of a right abdominal wall hematoma with active bleeding, approximately $20 \times 12 \times 15\,cm^3$, and an estimated volume of 2,000 cc, originating from the lumbar vertebrae (L) L3–L4 lumbar artery (Figure 2). The patient was immediately transferred to the angiography department, where embolization was performed with microparticles (150–250 μm), occluding the distal portion of L4 up to its origin. Additionally, collateral filling of the L5 lumbar artery was identified, which was also embolized using microparticles and 2 × 8 mm coils. More microparticles were applied to ensure hemostasis (Figure 3).

After the procedure, the patient was returned to the ICU with a progressive decrease in vasopressor support requirements. Adequate control of hemoglobin levels was achieved, with an expected increase after the transfusion. During the next 72 hours, strict monitoring of hemoglobin levels and hematoma size was performed, without evidence of rebleeding.

The resolution of the hypovolemic shock was satisfactory, allowing the patient to stabilize. This case highlights the importance of a rapid, multidisciplinary approach in critically ill patients with spontaneous hemorrhagic complications. The use of advanced diagnostic techniques and timely therapeutic intervention resolved the underlying cause of the shock and improved the patient's clinical outcome.

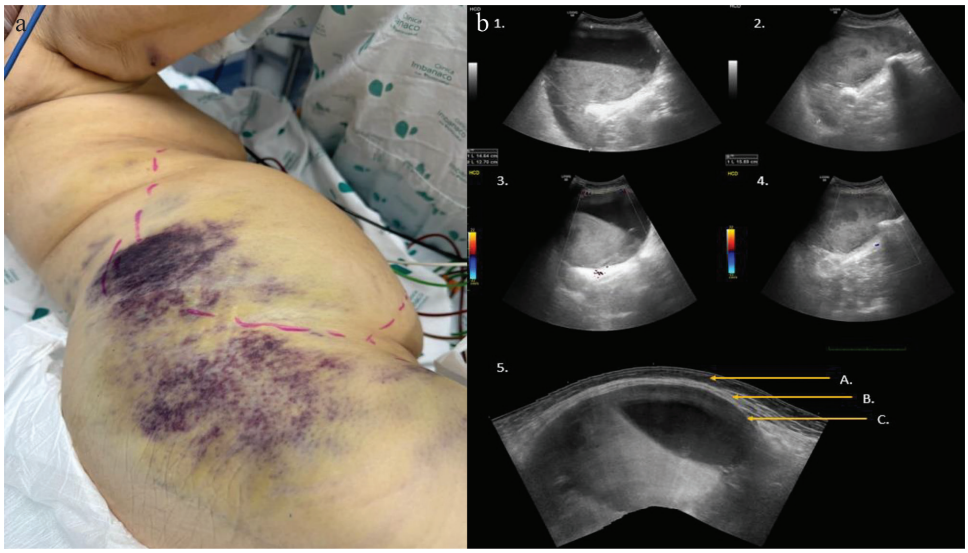

Figure 1 **(a)** Photograph of patient in left lateral decubitus position. Ecchymosis is observed from the flank to the iliac crest and the right gluteal ridge. The pink dotted lines correspond to the palpable non-pulsatile mass of the forming hematoma. **(b)** Ultrasound image of the abdominal wall showing different acquisitions (1, axial acquisition of the lesion, 2, longitudinal acquisition, 3 and 4 acquisitions with vascularization using color Doppler technique where absence of vascularization is identified). The image has characteristics of mixed echogenicity, with a fluid-fluid level inside, with an anechoic zone suggesting a component of the collection consistent with a recently formed hematoma, having an approximate volume of 1,464 ml. In image 5, an extended field acquisition is made where the extent of the collection can be distinguished, as well as its relationship with the superficial structures of the abdominal wall, observing that it is immersed in the muscular tissue of the abdominal wall (A, skin and subcutaneous tissue; B, right abdominal oblique muscles; C, abdominal wall collection).

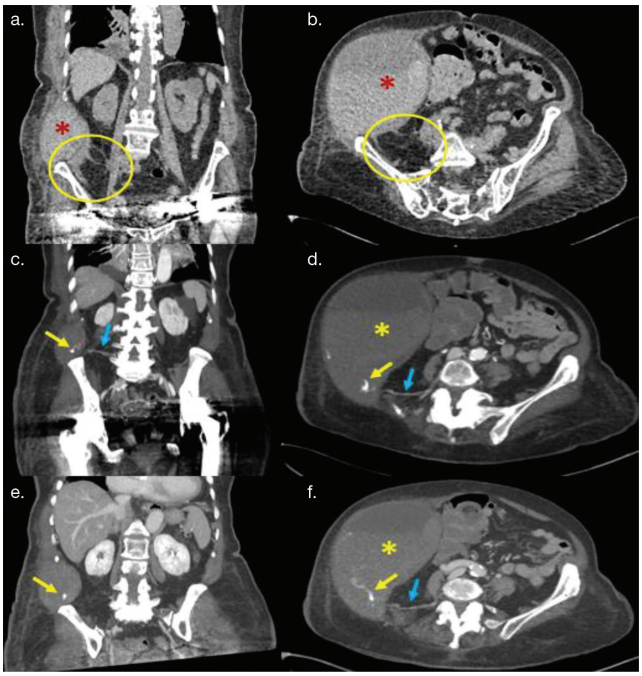

Figure 2 Abdominal angiographic-CT scan. Simple phase coronal (**a**) and axial reconstruction (**b**) acquisitions; venous phase coronal (**c**) and axial reconstruction (**d**); late phase coronal (**e**) and axial reconstruction (**f**). The yellow circle circumscribes changes in the fat of the infra-renal region specifically in the inter-fascial space of the right lumbar region. This corresponds to the area marked with blue arrows indicating the ipsilateral lumbar vessel identified in the other acquisitions with findings compatible with fat inflammatory phenomena that correlate with the findings of active bleeding in the abdominal wall collection area. In the anterolateral region of the abdomen, including the oblique muscles of the abdominal wall, a large collection consistent with a hematoma with signs of recent and active bleeding is identified. This is visualized from the simple acquisition (the hematoma is identified in panels **a** and **b** marked with a red asterisk, and in panels **d** and **f** with a yellow asterisk), which become more evident with signs of active bleeding better observed in venous and late acquisitions (panels **c**–**f** marked with a yellow arrow). This bleeding originates from lumbar vessels, specifically the lumbar vessel of the L5 segment on the right side, marked with blue arrows visualized in panels **c**, **d**, and **f**.

Ethical Approval and Informed Consent

Ethical approval to report these cases was given by the ethics committee of the institution. Written informed consent was obtained from the patient.

DISCUSSION

Retroperitoneal hematomas are frequently associated with conditions such as retroperitoneal neoplasms (in the kidney and adrenal glands), abdominal aortic aneurysms, traumatic vascular injuries, and coagulopathies [1,2]. However, they can also occur in the absence of these underlying factors. Notably, cases have been reported in patients with end-stage renal disease on hemodialysis, often under anticoagulant therapy [3]. The exact mechanism of spontaneous LAR is not fully understood; however, advanced age, renal failure, and anticoagulant therapies are well-documented risk factors [3,4]. Additionally, factors such as prolonged supine position and iliopsoas muscle strain may contribute to the development of this condition [5].

The first documented case of spontaneous LAR was reported by Hodin in 1969, involving a 72-year-old patient with chronic renal failure on hemodialysis, where heparin was identified as a key risk factor [1–6]. Transcatheter arterial embolization was crucial in controlling the bleeding.

Since then, subsequent studies have highlighted the importance of this technique in managing LAR. Yamamura et al. reported on four Japanese patients with spontaneous retroperitoneal bleeding, three of whom were treated with transcatheter embolization and one with surgical hemostasis [7]. Kim et al. conducted a review of 11 cases, observing a median age of 62 years, predominantly men, with renal failure or renal support therapy as common factors [8]. Clinical manifestations of bleeding are diverse and nonspecific, posing a high risk to life. Spontaneous retroperitoneal hemorrhage can present with symptoms such as acute abdominal or lumbar pain, nausea, vomiting, abdominal distension, bowel obstruction, unexplained hypovolemia, anemia, unexplained limb swelling, abnormal sensations (paresthesias), compression of the femoral nerve causing paralysis of a lower limb, muscle weakness, decreased knee or thigh reflexes, and/or increased intra-abdominal pressure associated with abdominal compartment syndrome [8].

Regarding the relationship between the genesis of spontaneous hemorrhage and the use of anticoagulants, spontaneous retroperitoneal hematoma secondary to lumbar artery bleeding in a patient treated with enoxaparin is a severe, rare complication with few scientific reports. However, those reported can be potentially fatal [8,9].

Enoxaparin, a low molecular weight heparin, is widely used for the prophylaxis and treatment of thromboembolic diseases, but its use may be associated with significant bleeding events, especially in patients with risk factors such as renal insufficiency, advanced age, and the concomitant use of other anticoagulants or antiplatelets [7]. Recent scientific studies have evaluated the potential benefit and superiority of clopidogrel use in patients requiring anticoagulant management compared to acetylsalicylic acid, particularly in terms of minimizing bleeding risk. Results suggest that clopidogrel may be a safer option in certain clinical contexts due to its hemorrhagic risk profile [10,11].

Management of retroperitoneal hematoma secondary to enoxaparin includes the immediate suspension

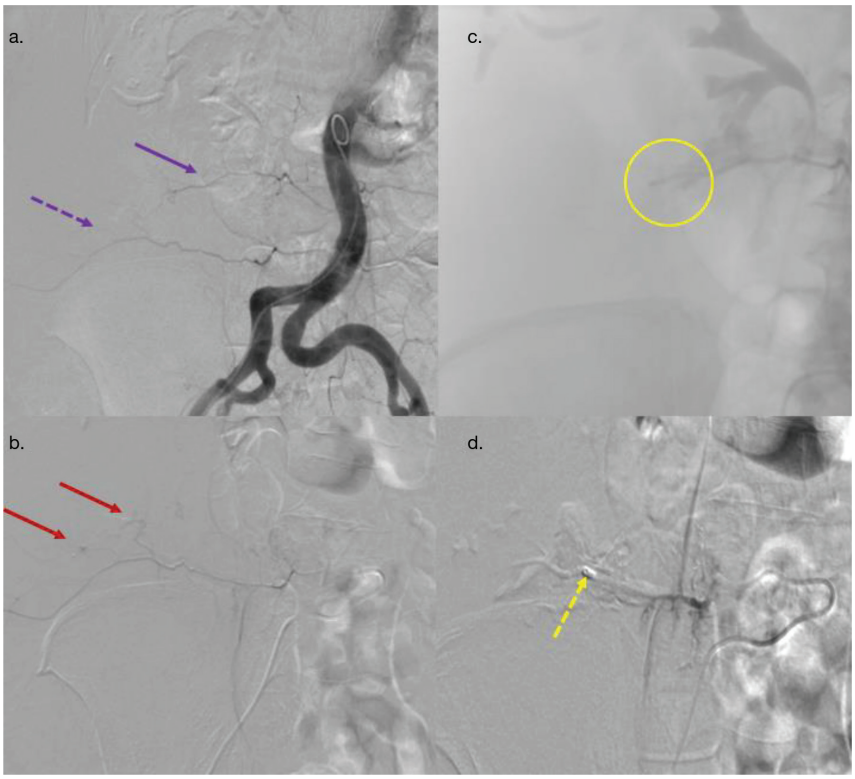

Figure 3 Abdominal arteriography showing lumbar branches indicated by purple arrows, the L4 lumbar branch with the continuous purple arrow and the L5 lumbar branch with the dotted purple arrow (**a**). Direct cannulation of the L4 branch revealed an anastomotic arch with L5 and the presence of bleeding from the L5 lumbar branch (red arrows) (**b**), hence embolization was performed with microparticles (150–250 µm) (yellow circle) (**c**). Additionally, embolization was performed with coils and microparticles in the L5 lumbar branch (yellow arrow) (**d**), successfully achieving hemostatic control.

of the anticoagulant and correction of the coagulopathy. In cases of hemodynamic instability, fluid resuscitation and blood transfusions may be required. Arterial embolization via angiography is an effective and less invasive therapeutic option compared to surgery, especially in cases of active bleeding from the lumbar artery, as was the sequence of therapeutic events described in our patient [12]. Surgical intervention may be necessary in cases of persistent clinical deterioration when embolization is not feasible or unsuccessful, and additionally when abdominal compartment syndrome develops [9].

It is crucial to closely monitor patients receiving enoxaparin treatment, especially those with risk factors, to detect early signs of retroperitoneal bleeding, such as abdominal pain, hypotension, and decreased hematocrit levels [3,12]. CT is the imaging modality of choice to confirm the diagnosis and guide therapeutic management [3]. In 2004, Isokangas et al. published the experience of a hospital with endovascular treatment in retroperitoneal hemorrhages secondary to anticoagulation [12]. In 10 consecutive cases, digital subtraction angiography revealed bleeding sites in the lumbar artery (4 cases), branch of the internal iliac artery (3 cases), and multiple sites (3 cases). The diagnostic orientation was premature based on abdominal aortic angiography. Embolization was successful in 89% of cases, while previous surgical interventions failed to control the bleeding.

From a scientific perspective, although information on the incidence, diagnosis, and management of this pathology remains limited, the reported cases and available literature, along with our experience as a level IV care center, underscore the importance of considering spontaneous LAR as a differential diagnosis in anticoagulated patients presenting with progressive anemia and hemodynamic instability without evident sources of macroscopic bleeding [1,5].

This reinforces the need for a multidisciplinary approach and the use of advanced techniques such as transcatheter embolization to improve clinical outcomes [4,7]. Based on our experience, it is suggested that in patients with risk factors for over-anticoagulation and pharmacological interaction, monitoring of anti-Xa levels should be performed. Furthermore, attention should be given to the appearance of new ecchymoses in the absence of trauma, predominantly in the abdominal

wall and lumbar dorsum region, in order to make a rapid and early approach and management.

CONCLUSION

The spontaneous rupture of the lumbar artery is a rare but potentially fatal complication in anticoagulated patients, requiring early diagnosis and timely management through a multidisciplinary approach. This case highlights the critical role of advanced techniques, such as transcatheter embolization, in controlling bleeding and improving clinical outcomes. Additionally, it emphasizes the importance of carefully evaluating drug interactions, rigorous monitoring in patients at risk of over-anticoagulation, and opting for personalized strategies in the selection of antiplatelet agents to minimize the risk of severe hemorrhagic complications.

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Ethics Statement

(1) All the authors mentioned in the manuscript have agreed to authorship, read and approved the manuscript, and given consent for submission and subsequent publication of the manuscript.
(2) The authors declare that they have read and abided by the JEVTM statement of ethical standards including rules of informed consent and ethical committee approval as stated in the article.

Conflicts of Interest

The authors declare no conflicts of interest.

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Author Contributions

All authors actively participated in the conception, design, and development of the study. Additionally, they substantially contributed to the drafting, critical review, and final approval of the manuscript, ensuring the integrity and accuracy of the presented content.

Declaration on the use of Generative AI in the Writing Process

No generative AI or AI-assisted technologies were used during the writing process of this manuscript.

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