

## Case of spontaneous hematoma of the renal compartment resulting in hemorrhagic shock: A unique presentation in urology

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World Journal of Advanced Research and Reviews, 2024, 21(02), 1606–1610

Publication history: Received on 14 January 2024; revised on 22 February 2024; accepted on 24 February 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.21.2.0617>

### Abstract

Hemorrhagic shock from spontaneous retroperitoneal hematoma of renal origin is a rare condition, and there are few publications on this subject. We present the case of a 60-year-old obese patient who experienced hemorrhagic shock from a right renal subcapsular hematoma that had ruptured into the retroperitoneum after initiation of anticoagulant treatment for acute pulmonary edema in the context of recurrent paroxysmal atrial fibrillation. The CT scan revealed a retroperitoneal hematoma and a possible hemorrhagic cyst in the right kidney. An emergency nephrectomy was necessary for hemostasis. The histology of the nephrectomy specimen confirmed the diagnosis of renal cell carcinoma.

**Keywords:** Hematoma; Compartment; Compromising; Shock

### 1. Introduction

Retroperitoneal hematoma is a rare cause of hemorrhagic shock (1). Although its preoperative diagnosis is easy to make, its cause often remains difficult to specify. The etiologies are multiple and dominated by renal tumors (1,2). In most cases, the hemorrhage remains confined to the subcapsular and retroperitoneal space, allowing tamponade to limit the hemodynamic consequences of the bleeding. However, in certain circumstances, bleeding can be excessive, leading to life-threatening hemorrhagic shock. Salvage nephrectomy is indicated in this case (1,2). We observed a spontaneous retroperitoneal hematoma with hemorrhagic shock due to the rupture of a cystic renal tumor in a patient under anticoagulant treatment for acute pulmonary edema in a context of recurrent paroxysmal atrial fibrillation. The purpose of this observation is to inform clinicians about the potential for hemorrhagic shock resulting from spontaneous hematoma of the renal compartment, particularly in patients receiving anticoagulant therapy.

### 2. Observation

A 60-year-old man with a BMI of 39.8Kg/m<sup>2</sup>, who has a history of arterial hypertension, atrial fibrillation, asthma, osteonecrosis of the femoral head, left hip prosthesis in 2006 and right in 2017, was initially hospitalized in the cardiology intensive care unit for acute pulmonary edema in a context of recurrent paroxysmal atrial fibrillation. He was later transferred to the cardiology sector due to clinical stability. After starting treatment with Lovenox 1200 UI twice a day, the patient experienced sudden pain in the lower right back, without fever, and with hemodynamic instability. The patient did not respond to vascular filling (1000ml) and experienced a decrease in hemoglobin levels by 3 points (hemoglobin at 10g/dl vs 7g/dl). This was accompanied by acute renal failure and oligoanuria. After taking the

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picture, a thoraco-abdominopelvic CT scan was performed, which identified a right renal subcapsular hematoma without active bleeding. The hematoma had partially evacuated into the retroperitoneum.

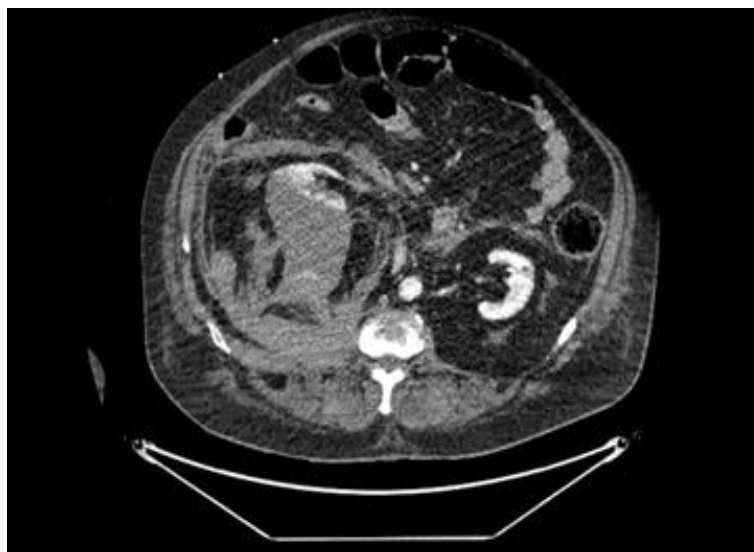
The patient received an additional 500 ml of vascular filling, 1 blood cell transfusion, antagonization with protamine 6000 IU, and antibiotic therapy with ceftriaxone 2 g. Subsequently, vasopressor support with norepinephrine was initiated, and the patient was transferred to the intensive care unit. The interventional radiology department was consulted for their objective evaluation, as there was no active bleeding requiring embolization. However, when faced with new hemodynamic instability and symptoms of hemorrhagic shock, a follow-up TAP scan was performed. The scan revealed a retroperitoneal hematoma that had doubled in size, and there was uncertainty regarding a 57 mm tissue process located at the upper pole of the right kidney. The patient underwent an emergency right hemostasis nephrectomy via retroperitoneal approach (lumbotomy) due to technical reasons and the risk of cancer cells spreading into the abdominal cavity. Following the surgery, the patient experienced impaired renal function, with a glomerular filtration rate decreasing from 54mL/min before surgery to 38mL/min. The surgical specimen was analyzed anatomopathologically, leading to the diagnosis of a well-defined, cystic, and hemorrhagic clear cell renal cell carcinoma of ISUP grade 3, measuring 6 cm along its long axis. The tumor was intra-parenchymal and classified as stage pT1b. The patient's case was referred to nephrologists for further treatment due to a single kidney and renal function deterioration. A multidisciplinary onco-urology consultation meeting will review the patient's file.

### 3. Discussion

Spontaneous retroperitoneal hematoma is a rare condition (3,4,5) first described by Wunderlich in 1856 (2,3,4,5,6). Despite progress in diagnostic methods, etiological diagnosis remains challenging. In over 50% of cases, the etiology is dominated by benign or malignant tumors of the kidney (2,3,4,5,7,8,9). It may be secondary to bleeding from a renal angiomyolipoma (8,10) or a renal carcinoma, or more rarely to a spontaneous rupture of a renal artery, an arteriovenous malformation, a simple cyst of the kidney, or be a manifestation of polyarteritis nodosa (6). Symptoms of renal bleeding can be frustrating, such as moderate pain or macroscopic hematuria. Lenk's triad presents the typical clinical picture of pain, shock, and lumbar swelling (1,2,11).

Hemorrhage in the renal compartment can be limited to the subcapsular and retroperitoneal space without hemodynamic consequences. However, in certain situations, it can be significant and rupture Gerota's fascia, extending into the peritoneal cavity and leading to hemorrhagic shock. Factors such as excessive doses of anticoagulants, advanced age, and kidney failure can trigger or aggravate the clinical picture of spontaneous hematoma (12).

The patient had comorbidities and was frail (13). They received relatively high doses of enoxaparin, 1mg/kg every twelve hours subcutaneously.



**Figure 1** Axial section shows a TAP scan injection. There is a right retroperitoneal hematoma with suspicion of a right intrarenal tissue process



**Figure 2** Injected thoraco-abdominopelvic CT showing the same images as Fig1 but in coronal section.

Few articles have discussed the association between spontaneous subcapsular renal hematoma and anticoagulant treatment (8, 9). However, retroperitoneal bleeding has been reported with the use of enoxaparin (13). Stephen L. Melde reported two cases of patients who developed retroperitoneal hematoma after taking enoxaparin. The risk is highest for those who receive doses approaching 1 mg/kg subcutaneously, suffer from renal insufficiency, advanced age, and concomitant treatment that may affect hemostasis (12, 13, 14).

The best examination to confirm the diagnosis is CT scanning, but it can sometimes be faulty (4, 6, 10, 13, 14). In cases of large hematomas, renal tumors may go unnoticed, and subcapsular hematomas of the kidney may appear to have the same density as the renal parenchyma on unenhanced images (2,6). In this case, the patient presented with a retroperitoneal hematoma, and there was uncertainty regarding the presence of a tissue process on the CT scan (Fig 1 and 2). The diagnosis of clear cell renal cell carcinoma was confirmed histologically.

The use of anticoagulants in patients with renal tumors can increase the risk of massive hemorrhage due to the neovascularization of the tumor. This can make the blood vessels fragile and more susceptible to spontaneous rupture, leading to hemodynamic instability and, in severe cases, shock (8,12). The patient's retroperitoneal hematoma, complicated by hemorrhagic shock, was likely caused by a combination of enoxaparin treatment and the presence of a renal tumor. The hematoma may have initially developed without noticeable symptoms, but eventually intensified, leading to changes in clinical examination (8,12).

Treatment for retroperitoneal hematoma is dependent on the patient's clinical condition and imaging results, particularly CT scans. (2)

If the patient is hemodynamically stable, we will monitor them clinically using crystalloids, blood transfusions, and possibly neutralizing treatment if anticoagulation has caused bleeding.

Initially, the patient received all of these measures and was given protamine to minimize the effects of enoxaparin, which was prescribed for acute pulmonary edema in the context of recurrent paroxysmal atrial fibrillation.

If the hemorrhage is not well-tolerated, regardless of the underlying pathology, renal embolization is the recommended emergency treatment. This procedure allows for hemostasis to be achieved and the responsible lesion to be identified. If there is a failure or lack of technical support, hemostasis nephrectomy is indicated. Causal treatment is administered remotely after the patient has stabilized (15).

The patient had comorbidities and was fragile. Despite the deterioration of their clinical condition, the radiologists did not find any indication of possible renal embolization. The scan did not show active bleeding.

If imaging does not find a cause for the bleeding, it is possible that a malignant tumor is present. In such cases, some authors recommend regular and repeated clinical and radiological monitoring to identify the cause of the bleeding (11). In cases where the contralateral kidney poses no issue, some authors recommend radical nephrectomy (3, 9, 13, 16). Arteriography is suggested by some authors when the CT scan is negative or in the presence of vascular pathology (8). This procedure can help locate the source of bleeding and enable therapeutic embolization (4).

If hemodynamic instability with hemorrhagic shock occurs, surgical intervention is necessary. An urgent salvage nephrectomy is performed (1, 2, 5, 7). The patient presented with hemodynamic instability and hemorrhagic shock. A second thoraco-abdominopelvic CT scan revealed a retroperitoneal hematoma that had doubled in size. Additionally, there was uncertainty regarding a 57 mm tissue process on the upper pole of the right kidney, which was cystic and hemorrhagic. Thus, it is believed that the retroperitoneal hematoma was caused by the rupture of the renal tumor. The high-dose curative anticoagulation may have worsened the bleeding, leading to the hemorrhagic shock (9,12). An urgent radical nephrectomy was performed via retroperitoneal approach (lombotomy) for technical reasons. However, it was considered that this approach could limit the possible dissemination of tumor cells, especially peritoneal carcinomatosis (15). The patient's postoperative course was uneventful. Pathological examination revealed the presence of clear cell renal cell carcinoma. The patient has been referred to the nephrology department for further treatment, and their file will be reviewed in a consultation meeting.

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#### 4. Conclusion

Retroperitoneal hematoma is a rare condition that can lead to hemorrhagic shock. Determining the cause of bleeding can be challenging despite medical imaging. Renal neoplasia should be considered as the primary cause of hemorrhage when the cause is unknown. In patients treated with enoxaparin who experience unexplained decreases in hemoglobin, hematocrit, or hemorrhagic shock, retroperitoneal hematoma should be included in the differential diagnosis. Renal embolization is the primary emergency treatment for this condition. Salvage nephrectomy should only be considered in cases of failure or lack of technical support.

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#### Compliance with ethical standards

##### *Acknowledgments*

We would like to thank Dr. Vasile BUDA for her assistance and guidance in this paper.

##### *Disclosure of conflict of interest*

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##### *Statement of ethical approval*

The present research work does not contain any studies performed on animals/humans' subjects by any of the authors.

##### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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