

## C A S E R E P O R T

# Hypovolemic shock due to rectus sheath hematoma secondary to subcutaneous low molecular weight heparin: A case report

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**Abstract.** Rectus sheath hematoma (RSH) is a rare clinical entity caused by the rupture of the epigastric arteries or the rectus abdominal muscle itself, leading to the accumulation of blood in this location. It is a potentially fatal condition that mimics an acute belly condition. It is crucial to identify and treat it early to avoid unfavorable outcomes. We present the case of an 85-year-old woman hospitalized for pneumonia and respiratory failure who developed refractory hypovolemic shock associated with an abdominal mass. Computed tomography with angiography was performed, which detected the presence of a large hematoma of the wall of both rectus abdominal. ([www.actabiomedica.it](http://www.actabiomedica.it))

**Key words:** Rectus sheath hematoma, Hypovolemic shock, Low molecular weight heparin, Case report

## Introduction

RSH results from the accumulation of blood within the wall sheath of the rectus abdominal. It is a unique condition that can mimic a series of acute intra-abdominal pathologies. Its diagnosis requires a high clinical suspicion and immediate treatment; however, its presentation as a hypovolemic shock is even rarer. Treatment is based on a conservative strategy, embolization, and surgery, in addition to volume replacement with blood and fluids.

## Case description

We present the case of an 85-year-old woman who came to the ED for dyspnea, productive cough and wheezing for one week. As a personal history, she had type 2 diabetes mellitus, dyslipidemia, essential arterial hypertension, hypothyroidism, and atrial fibrillation medicated with warfarin 5 mg and amiodarone 200 mg once daily. She was also taking levothyroxine

0.112 mg id, pravastatin 20 mg id, furosemide 40 mg id and metformin 500 mg id. She had no history of drug or food allergies, falls, trauma, or surgical interventions. She had no relevant past interventions.

Upon admission to the ER, she was febrile (38.2°C), tachycardic (110 bpm), dyspneic and with low oxygen saturations (87%) on room air, requiring bronchodilation and oxygen therapy. On pulmonary auscultation, scattered wheezing and rumbling were detected in the lower right lung field. Chest radiography was compatible with a pulmonary focus in the previously described area, and the electrocardiogram (ECG) showed atrial fibrillation. She had a haemoglobin of 12.9 g/dl with no other changes in the blood count, and clotting times were within normal ranges.

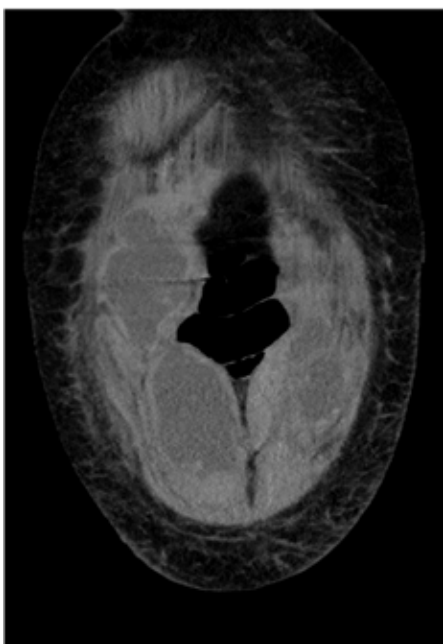
PCR swab of SARS-COV2 was negative. She was diagnosed with community-acquired pneumonia and started on amoxicillin/clavulanic acid 1.2 g every 8 hours and azithromycin 500 mg id, bronchodilator therapy and low molecular weight heparin (LMWH) at a therapeutic dose (60 mg twice daily), considering the patient's history. The CURB-65 was 2 points, and

the pneumonia severity score index was 125 points, so hospitalization for clinical compensation was decided.

On the second day of hospitalization, she developed hypotension, refractory to fluid therapy. We started aminergic support with dopamine in a peripheral catheter (3 ug/Kg/h). She had bouts of coughing and preserved respiratory failure. However, in the abdominal evaluation, extensive ecchymosis was identified in the left flank, periumbilical and suprapubic regions with pain on palpation. There was a decrease in haemoglobin value to 9.1 g/dL. We started blood transfusions.

Computed tomography (CT) with angiography was performed, which reported the presence of “hematoma of the rectus abdominal bilaterally, starting superiorly at the lower edge of the last rib and extending to the pubic symphysis with a longitudinal extension of about 26 cm, with signs of active hemorrhage in the superior epigastric artery”. (Figures 1 and 2)

LMWH was suspended immediately. The patient maintained fluid therapy and dopamine and underwent embolization with microspheres of the left superior epigastric artery and the right epigastric artery due to a doubtful focus by Interventional Imaging. The procedure was uneventful.



**Figure 1** – coronal view of the rectus sheath hematoma.



**Figure 2** – transversal view of the rectus sheath hematoma (orange arrow demonstrates left superior epigastric artery with active bleeding).

The patient was transferred to the Intermediate Care Unit after the procedure for stabilization and surveillance. She was under dopamine for two days with progressive and slow weaning. We repeated the blood count with a haemoglobin of 11.4 g/dl. The patient was transferred to the Internal Medicine department two days later.

Given the permanent AF condition, a transthoracic echocardiogram was performed to exclude contraindications for starting new oral anticoagulants. She had no thrombi in the left atrium, and we started apixaban 2.5 mg twice daily.

We repeated an abdominopelvic CT scan approximately seven days after the intervention, which did not identify new hemorrhagic foci, and the hematoma maintained the previous dimensions.

She underwent five days of amoxicillin/clavulanic acid and three days of azithromycin with an excellent clinical and analytical response, being possible to reduce the need for oxygen and bronchodilator therapy progressively. The patient was discharged 24 days later. She had a reassessment visit about one month after discharge. She remained with no symptoms; stable haemoglobin values with 11.2 g/dL and a decrease in the dimensions of the hematoma were recorded on a new abdominal ultrasound.

## Discussion

The most prevalent form of underdiagnosed disease entity, with a high fatality rate, is RSH. It can imitate several intra-abdominal diseases.

The inferior and superior epigastric arteries deliver blood to the rectus abdominal muscle. One-third of the distance between the pubic symphysis and the umbilicus is represented by the arcuate line, which is a horizontal arc. It establishes the rectus sheath's bottom boundary. Without this support, the muscle's bottom half is more susceptible to alterations that may impair mobility, like trauma or injections. RSH can occasionally advance to the retroperitoneum or cross the midline and become bilateral, as in our case description (1).

Most patients with this condition exhibit an acute onset of abdominal pain with a palpable abdominal mass. Other symptoms may be nausea, fever, chills, and vomiting. Depending on the size and location of the assembly, patients may also show signs of abdominal compartment syndrome or hypovolemic shock. Risk factors, such as anticoagulation drugs, age, abdominal obesity, chronic kidney disease and hypertension, can affect its development (2). We identified all these risk factors in our patient.

One of the most common conditions that can affect the development and maintenance of RSH is severe coughing. This condition usually occurs during the flares of asthma or upper respiratory tract infections, like in our case. We used Grey Turner's sign to identify this condition in the physical exam. A CT scan with intravenous contrast can confirm the diagnosis and a serial level of hematocrit or haemoglobin must be performed to rule out an undiagnosed hematologic disorder.

The treatment of patients with RSH depends on their clinical condition and the underlying cause. According to recent studies, conservative treatment is usually the preferred method for patients and an invasive procedure is also considered for unstable patients. Management includes using blood products and intravenous fluids and the reversal of anticoagulation. If the patient is not responding to aggressive treatment or has a prolonged transfusion requirement, they should be referred to angiography for possible embolization (3).

Several cases of RSH due to enoxaparin are described in the literature (4,5,6); however, few have favourable response with embolization treatment. We believe this type of treatment should be more generalized in most hospitals, as it allows immediate and direct treatment of the affected artery without the possible unfavorable outcomes of surgery. And in most cases, conservative treatment is the option, also without a favourable result in such a short period. In addition, we would like to reinforce that this pathology can have a rapid presentation, like in our case, within the first 24 hours of the beginning of symptoms and in a rare percentage, it can be presented as a refractory hypovolemic shock and how treated it.

The patient remains in Internal Medicine follow-up, having repeated three months of hospital discharge with a new abdominal CT scan, which refers to an increase in the hematoma volume.

There are various types of anticoagulant drugs that can affect the development and maintenance of RSH. This condition has been known to have a wide range of cases. Although LMWH is commonly administered under the skin, an accidental puncture of the inferior or superior epigastric artery can happen. However, the needles used for this procedure are very short and can't penetrate deep enough to reach the inner ear. It is also possible that this complication could be caused by the local effects of the drug on the rectus muscles. In our case, using enoxaparin in a therapeutic dose was the trigger for this condition (7).

Furthermore, it is essential to consider the need for anticoagulation after the initial diagnostic and treatment. For patients with long-term anticoagulation, the therapy should be resumed immediately upon discharge from the hospital once the hemoglobin levels stabilize, there are no other signs of hemorrhage, and the dimensions of the hematoma are stable.

## Conclusion

The diagnosis of LMWH-associated RSH is very challenging to make.

The principal evaluation we must do in this condition is a complete physical exam, with particular attention to the abdominal region and consider the curve

of haemoglobin values. This condition can develop in less than 24 hours, and the development of refractory hypovolemic shock should be taken care of as a complication and identificatory signal. And if possible, we should consider treatment with embolization of the affected artery as one of the first lines of treatment.

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