

## Full Endovascular Management in Simultaneous Ischemic and Bleeding Complications during Covid 19 Pandemic in Northern Italy

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### Abstract

**Purpose:** to report a case of a Non ST Elevation Myocardial Infarction (NSTEMI) type 1 occurring at the same time of a rectus sheath bleeding during anticoagulation therapy with Enoxaparin and its staged endovascular management.

**Case Report:** A 79-year-old man, with an aortic valve mechanical prosthesis was admitted to Medicine ward with a diagnosis of interstitial pneumonia caused by SARS CoV 2. Due to a difficult control of International Normalized Ratio (INR), the patient was shifted to Enoxaparin. After six days, blood sample tests revealed mild anemia and an abdomen contrast computed tomography (CT) revealed an active bleeding from left inferior epigastric artery. An endovascular management was chosen. Before the procedure, the patient reported chest pain, with diffuse ST-T depression at electrocardiogram (ECG) and posterior and lateral walls hypokinesia at transthoracic ecocardiography. He was admitted to Cath Lab to perform the embolization and coronary angiography, which showed a three-vessel disease. Given the recent bleeding, we decided to wait for anhemoglobine stabilization. After heart team discussion, endovascular revascularization was chosen.

**Conclusion:** A NSTEMI type 1 occurring during an epigastric artery bleeding has never been reported in literature. We successfully treated the patient through a staged endovascular management.

**Keywords:** Rectus sheath hematoma; Enoxaparin; NSTEMI; Cath Lab; Endovascular management

### Introduction

Rectus sheath hematoma is a relatively rare clinical condition, resulting from bleeding into the rectus sheath, after damage to the epigastric arteries or by direct muscular tear. It has been strongly associated with blunt abdominal trauma and anticoagulation<sup>[1]</sup>. Risk factors include anticoagulation, trauma, pregnancy, repeated Valsalva maneuvers, recent laparoscopic surgeries, recent invasive procedures (such as paracentesis), hypertension, coughing, and advanced age<sup>[2]</sup>.

Rectus sheath hematoma is a well-documented condition during parenteral anticoagulation therapy with enoxaparin<sup>[3]</sup>. An overall mortality of 4% and 25% for rectus sheath haematoma secondary to anticoagulation therapy has been reported<sup>[4]</sup>. Invasive management should be considered in hemodynamically unstable patients, with enlarging haematomas. Two main procedures can be used for invasive treatment: angiography and embolization or surgical ligation of bleeding vessels<sup>[5]</sup>.

We present a clinical case in which a rectus sheath hematoma, caused by an active bleeding from the left inferior epigastric artery, was associated to a myocardial infarction. We report our staged endovascular management.

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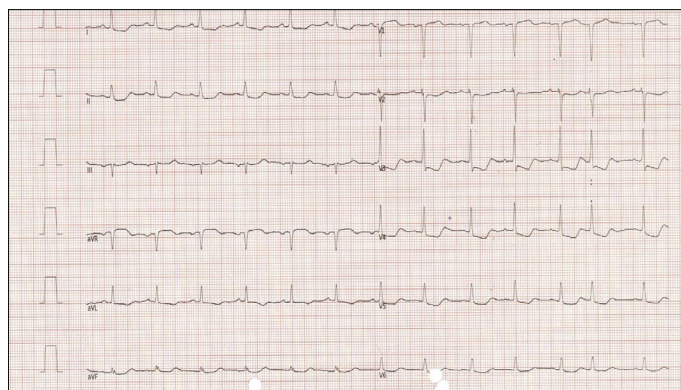
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## Case report

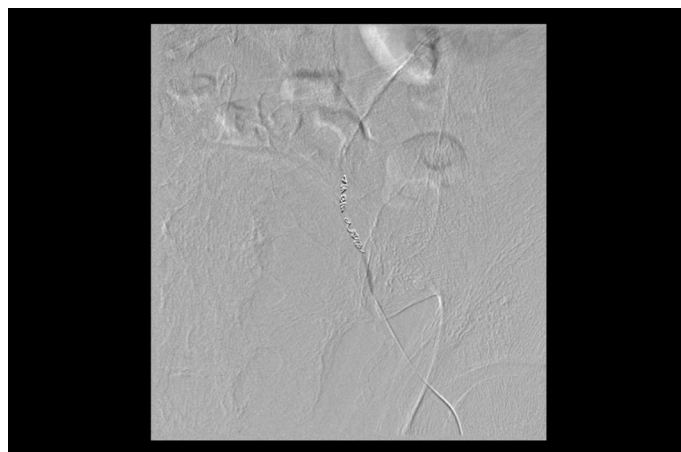
A 79-year-old man, with a history of aortic valve replacement with mechanical prosthesis for severe aortic stenosis plus single venous saphenous bypass graft on right coronary artery in 2004, was admitted to Medicine ward for dyspnea and fever and a diagnosis of interstitial pneumonia caused by SARS CoV 2 was made. Admission blood sample tests revealed an increased International Normalized Ratio (INR) (5.6) with normal blood cell count (White Blood Cells 8.500/mL, hemoglobin 13.1 g/dL), normal myocardial injury bio-markers and elevated C Reactive Protein (25 mg/dL) (Table 1). He was treated with intravenous administration of 5 mg Phytonadione, thus reaching a INR value of 1.4. Due to a difficult control of INR during the acute phase, the patient was temporarily shifted on subcutaneous administration of Enoxaparin. After six days, he reported abdominal pain and an abdominal wall swelling were noted. Blood sample tests revealed mild anaemia (hemoglobin 11.6 g/dL). An abdomen contrast Computed Tomography (CT) was performed and revealed an active bleeding from left inferior epigastric artery causing rectus sheath hematoma (diameter of 131 mm) and a pelvic extravasation (diameter of 109 mm) (Figure 1). Transcatheter angiography for embolisation was scheduled for the next day. Before the procedure, the patient reported chest pain and dyspnea. The vital signs were: blood pressure of 100/60 mmHg, heart rate of 80 beats per minute, oxygen saturation of 98%, body temperature of 36° C. The blood sample tests documented a further decrease in hemoglobin (9.7 g/dL) and mildly elevated levels of Troponin I (45 ng/mL) and CK-MB (260ng/mL) (Table 1). A 12-lead electrocardiogram (ECG) showed a diffuse ST-T depression, more prominent in the inferior and lateral leads (Figure 2). Transthoracic ecocardiography revealed normal left ventricular dimensions with increased wall thickness and inferior, posterior and lateral walls hypokinesia, with an estimated ejection fraction of 45%. The aortic prosthetic mechanical valve function was normal. The patient was admitted into Cath Lab to perform left inferior epigastric artery embolisation and coronary angiography. The epigastric artery occlusion was obtained with transcatheter implant of two coils (the first with diameter of 4 mm and length of 80 mm; the second with diameter of 5 mm and length of 80 mm) inserted via left femoral artery (Figure 3). Coronary angiography showed a three-vessel disease (Thrombolysis in Myocardial Infarction flow grade three in all vessels) with patent graft on right coronary artery, critical stenosis on Left Main coronary artery, Circumflex artery and on distal segment of Left Anterior Descending artery. Left Main and distal Circumflex stenosis appeared tight and disomogeneous; these angiographic features, associated to clinical and echocardiography findings, let us to consider them culprit lesions. Given the recent bleeding, we decided to wait for hemoglobine stabilization before performing coronary revascularization and the patient was started on Aspirin in addition to unfractionated heparin. The patient was also transfused with 2 units of packed red blood cells. After heart team discussion, due to a high risk of redo cardiac surgery, endovascular revascularization was chosen.



**Figure 1:** 3D abdomen contrast angiography showing inferior epigastric artery bleeding



**Figure 2:** Admission electrocardiogram.



**Figure 3:** Abdominal angiogram showing the left inferior epigastric artery embolization obtained with 2 coils.

After 8 days, hemoglobine levels were stable, and therefore left main and circumflex artery angioplasty with four Zotarolimus eluting stents implantation was performed. For left main, a provisional approach and final Proximal Optimisation Technique (POT) was performed. Clopidogrel was added to the ongoing therapy and Warfarin restarted. After a close monitoring and hemoglobin normalization, he was discharged after 8 days, with ST segment normalization at ECG.

Table 1:

Blood Sample Tests and Vital Signs	Admission	7TH Day	Discharge	Normal Values
White Blood Cells	8.500/uL	11.000/uL	7.500/uL	4.000-10.800/uL
Hemoglobin	13.1 g/dL	9.7 g/dL	13.5 g/dL	12-16 g/dL
Reactive C Protein	25 mg/dL	35 mg/dL	4.5	< 5 mg/dL
TnI	0.040 ng/mL	45 ng/mL	0.045 ng/mL	0.010-0.050 ng/mL
CK-MB	4 ng/mL	260 ng/mL	3.3 ng/mL	0.50-3.6 ng/mL
INR	5.6	None	2.9	2.5-3.5 (with mechanical prosthesis)
Blood Pressure	120/70 mmHg	100/60 mmHg	120/60 mmHg	<140/80 mmHg
Heart Rate	75 bpm	80 bpm	65 bpm	60-100 bpm
Oxygen Saturation	95%	98%	99%	> 96%
Temperature	38.5°C	36°C	36°C	< 37°C

## Discussion

We report a Non-ST elevation Myocardial Infarction type 1 occurring at the same time of a rectus sheath bleeding. A stenosis was considered as culprit lesion in case of angiographic evidence of thrombotic occlusion or subocclusion<sup>[6]</sup>.

The treatment was challenging due to the cardiac condition requiring triple antithrombotic therapy, which was however contraindicated due to the bleeding. In this setting Cath Lab role was crucial.

In the same procedure, an epigastric embolisation was performed, thus allowing to stop the bleeding, which represented the time-dependent, life threatening condition; then, a coronary angiography was performed and allowed to find an unstable plaque determining ischaemia. Given the normal coronary flow, despite the critical coronary stenosis, we decided to delay revascularization. After few days, when the patient clinical conditions were stable, we performed the culprit lesion angioplasty.

Generally, angiography and embolisation is needed in patients with acute bleeding and haemodynamic instability<sup>[7]</sup>. We preferred the angiographic approach to perform in the same setting a coronary angiography.

In the clinical scenario of Covid-19, it is important to take into account a possible risk of coagulopathy and bleeding, which would require the involvement of an interventional cardiologist in an emergency setting<sup>[8]</sup>.

## Conclusion

A Non-ST elevation MI type 1 occurring during an epigastric artery bleeding has never been reported in literature. Complications of COVID 19 disease is probable cause of NSTEMI type 1 MI as the patient is 79 years old with background of history of aortic valve replacement with mechanical prosthesis for severe aortic stenosis plus single venous saphenous bypass graft on right coronary artery in 2004.

We successfully treated the patient through a staged endovascular management.

Three months after procedures, the patient was under regular follow-up and his condition was good.

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## Conflict of Interest

The authors certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

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