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CASE REPORT

Atrial fibrillation-related acute myocardial infarction and acute mesenteric ischemia

Atrial fibrilasyon ilişkili akut miyokart enfarktüsü ve akut mezenterik iskemi

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Summary– Atrial fibrillation-related synchronous thromboembolism of the mesenteric and coronary arteries is a rare event. This case report is about an 82-year-old male patient who presented to the emergency department with epigastric pain and who was diagnosed with ST-elevated myocardial infarction accompanied with acute mesenteric ischemia. To our knowledge, this is the first report of angiographic evidence of synchronous thrombus in both the arteries.

Özet– Mezenter ve koroner arterlerde eş zamanlı atrial fibrilasyon ilişkili tromboembolizm nadir görülen bir durumdur. Bu olguda, epigastrik ağrı şikayeti ile acil servise başvuran eş zamanlı ST yükselmeli miyokart enfarktüsü ve akut mezenterik iskemi saptanan 82 yaşında erkek hasta sunuyoruz. Bu her iki arterde de senkronize trombüsün anjiografik olarak gösterildiği ilk vakadır.

Arterial thromboembolism is the most serious complication of atrial fibrillation (AF). Thromboembolism occurs most commonly in the cerebral artery; however, AF-related thromboembolism also occurs in the coronary, renal, peripheral, mesenteric, and other arteries. Although there are reported cases of synchronous coronary and cerebral arterial thromboembolism, cases with multiple arterial thromboembolism are rare.[1,2]

Acute mesenteric ischemia rarely causes abdominal pain; however, it is associated with a high mortality rate, ranging from 50% to 80%.[3,4] A thrombus most commonly originates in the cardiac chambers and is usually accompanied by arrhythmia, myocardial infarction, valve disease, and prolonged hypotension.[5]

We present one of the rare cases of AF-related synchronous thromboembolism of the mesenteric and coronary arteries. In the medical literature, there are 2 other case reports of synchronous coronary and mesenteric arterial thromboembolism.[6,7]

CASE REPORT

An 82-year-old male with a history of hypertension, type 2 diabetes mellitus, and coronary artery disease presented to the emergency department with epigastric pain for the past 10 hours. The patient had no abdominal rebound or guarding. At admission, his heart rate was 72 bpm, blood pressure was 105/67 mmHg, and oxygen saturation was 98% in ambient air. The patient's initial electrocardiogram (ECG) recorded in the emergency department was consistent with anterior ST-elevation myocardial infarction, and his rhythm was suggestive of AF (Figure 1). The patient had no history of AF or anticoagulation. There was no evidence of thrombophilia, such as myeloproliferative disorder, cancer, traumatic injury, or inherited hematologic disorder.

The transthoracic echocardiography of the patient showed anterior wall hypokinesia. The left ventricle ejection fraction was 40%, and there was no evidence of intra-cardiac thrombus. The study of cardiac enzymes revealed a high-sensitivity troponin

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I >500.000 ng/mL (reference range: 0.000-0.034). Written informed consent was obtained from the patient. The patient was then initiated on oral antiplatelet therapy (acetylsalicylic acid 300 mg and clopidogrel 600 mg) and underwent coronary angiography. The proximal left anterior descending (LAD) artery was completely occluded by a fresh thrombus (Video 1* and Figure 2A). A drug-eluting stent was implanted in the LAD lesion, and the subsequent angiography showed thrombolysis in myocardial infarction flow grade 3 (Video 2* and Figure 2B). Due to persisting abdominal symptoms following coronary revascularization, the presence of AF with a high CHA_2DS_2-VASc score, elevated lactate levels in arterial blood gas (10.5 mmol/L) despite normal blood pressure, and absence of significant atherosclerotic lesions in coronary arteries, mesenteric angiography was performed, which revealed a total occlusion with thrombus that extended 5 cm beyond the origin of the superior mesenteric artery (SMA) (Figure 3A).

Abbreviations:

AF	*Atrial fibrillation*
ECG	*Electrocardiogram*
LAD	*Left anterior descending*
SMA	*Superior mesenteric artery*

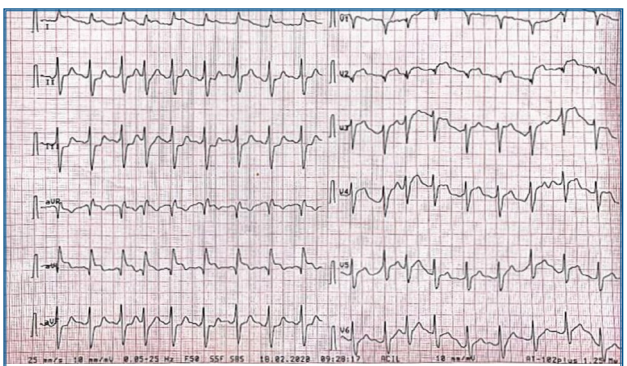

Figure 1. Electrocardiogram of the patient represents ST segment elevation in leadsDI, aVL, V2, V3, and V4 and reciprocalST segment depression in leads D3, aVF. Rhythm is atrial fibrillation.

The patient was consulted with general surgery and interventional radiology departments, and a percutaneous procedure was determined to be an optimal approach. The patient underwent percutaneous transluminal angioplasty and achieved blood flow (Video 3* and Figure 3B). Due to the distal embolization of some of the SMA branches, the flow to the distal vascular bed was inadequate. Therefore, the patient was re-examined by the general surgery department and was scheduled for exploratory laparotomy. Unfortunately, the patient died from extensive bowel necrosis during the operation.

DISCUSSION

There is limited literature on myocardial infarction and accompanying acute mesenteric ischemia. There

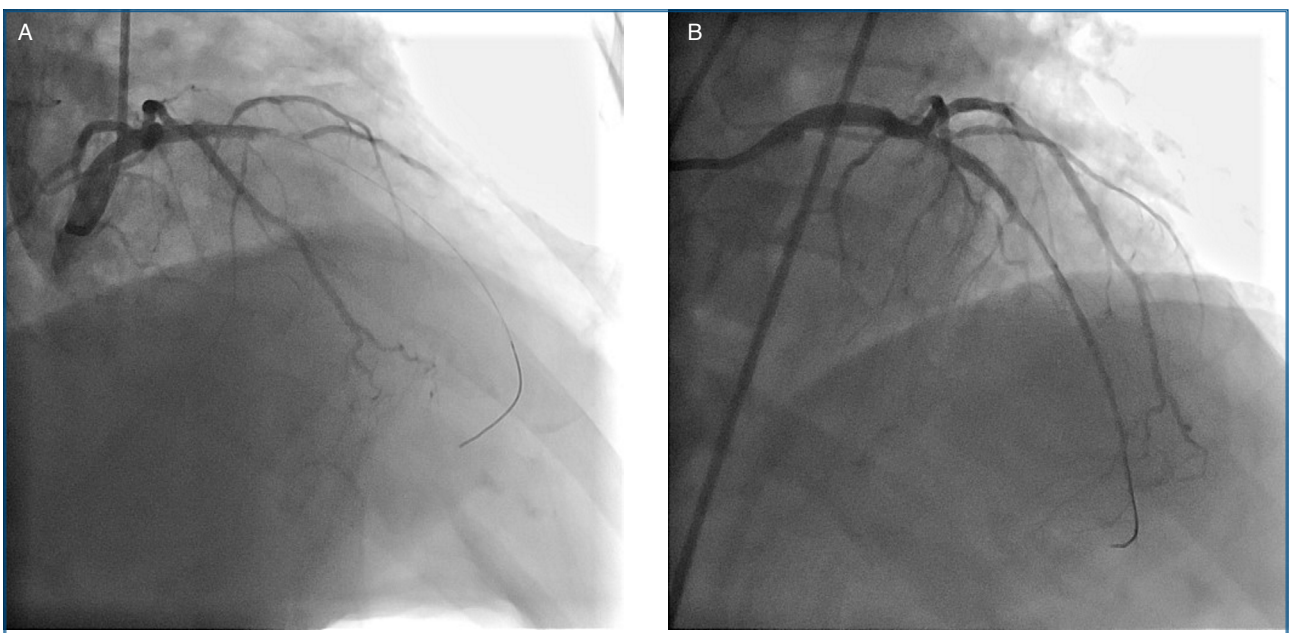

Figure 2. (A) Total occlusion of the left anterior descending (LAD) artery. **(B)** After balloon angioplasty and stenting, complete opening of the LAD artery was achieved.

Figure 3. (A) Total occlusion of the superior mesenteric artery (SMA) (black arrow). **(B)** After balloon angioplasty of the SMA, the vessel was opened but tissue perfusion was suboptimal (not shown).

are 2 published case reports of synchronous acute myocardial infarction and mesenteric ischemia, and AF has also been reported in these 2 cases, similar to our report.

The diagnosis of mesenteric ischemia may be overlooked with typical ECG results and a complaint of epigastric pain. We first performed coronary intervention because there was a large myocardial area at risk of ischemia based on the current coronary angiography. The patient underwent intervention in less than 1 hour after his admission to the emergency department. Mesenteric ischemia to which the patient's symptoms could be attributed had already developed, although we were able to open the culprit coronary lesion. The elevated lactate levels and AF rhythm of the patient supported the diagnosis of mesenteric ischemia. Moreover, the patient had a CHA_2DS_2-VASc score of 5, which is considered a high-risk category for thromboembolic events.

In contrast with the previous case reports,[6,7] we would have preferred mesenteric angiography to make the diagnosis, followed by an invasive approach if necessary. However, performing surgery for mesenteric ischemia before coronary intervention would increase surgical risk and limit the benefits of coronary intervention. No major bleeding developed because of anticoagulants or anti-platelets required for coronary intervention. Nevertheless, the management of mesenteric ischemia was delayed because of the coronary intervention.

In contrast with the previous case report[6,7] where the patient was preferred to be treated conservatively and followed up, our case is notable in terms of an invasive approach to mesenteric ischemia. Furthermore, this is the only reported case where coronary angiography revealed totally occluded coronary arteries.

If our patient had survived, the further treatment would be triple antithrombotic therapy with 2 antiplatelet agents and an anticoagulant for at least 1 month, considering the risks of recurrent embolism and bleeding.

Disruption of an atherosclerotic plaque is the major pathophysiology of myocardial infarction. Furthermore, non-atherosclerotic myocardial infarction etiologies such as coronary vasospasm, coronary artery embolism, hypercoagulable states, spontaneous coronary dissection, and vasculitis should not be ignored.[8] Coronary artery embolism accounts for 3%-4% of diagnosed myocardial infarction etiology. AF is the major cause of coronary artery embolism. Moreover, myocardial infarction caused by arterial embolism has a poorer prognosis than atherosclerotic etiology.[9]

An approach of open vascular surgery provides revascularization of the main vascular bed and culprit lesion of the SMA, but distal side branches cannot be revascularized using this approach. However, a percutaneous approach may be used to revascularize the distal branches.[10] A recent study showed lower rates of abdominal laparotomy following an endovascular approach than following open vascular surgery.[11] Physicians may prefer an endovascular approach because of its lower laparotomy rates and chance of revascularizing the distal side branches, especially given the high mortality rates associated with the open surgical option.

In conclusion, it is challenging to manage such a case. If a patient presents with epigastric pain, both abdominal and cardiac pathologies should be considered. If there is an initial clinical suspicion of mesenteric ischemia, mesenteric angiography and coronary angiography should be performed for a patient presenting with abdominal discomfort and acute myocardial infarction. Mesenteric angiography can help to determine a clear differential diagnosis in a shorter time. Patient complaints are essential, and factors such as AF, advanced age, and elevated lactate levels should not be ignored. With this case report, we attempted to emphasize the rare but significant association between mesenteric ischemia and myocardial infarction as well as the best practices for its management. A close cooperation between emergency medicine specialists, general surgeons, radiologists, cardiologists, and anesthetists is of vital importance for this patient group. For the selection of the treatment approach for mesenteric ischemia, it is important to get the opinions of both general surgery and interventional radiology departments and to make a joint decision depending on the patient's risk. Furthermore, primary prevention of AF is essential.

*Supplementary video files associated with this article can be found in the online version of the journal.

Informed Consent: Informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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Keywords: Atrial fibrillation; thromboembolism; acute anterior wall myocardial infarction; acute mesenteric arterial embolus

Anahtar Kelimeler: Atrial fibrilasyon; tromboembolizm; akut dış duvar miyokart enfarktüsü; akut mezenterik iskemi