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Case Report

A Fatal Case of Acute Thrombotic Occlusion in More Than 3 Epicardial Coronary Arteries Associated with the Yasmin Oral Contraceptive

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Abstract

We report a case of a myocardial infarction (MI) due to multiple culprit vessels in a young woman. MI caused by more than 1 culprit vessel is very rare. Oral contraceptives (OCSs) are used for birth control. Despite a few case reports, the association between the new-generation OCS use and the MI risk remains controversial. A 53-year-old woman who had been consuming combined OCS-Yasmin (30 µg of ethinyl estradiol and 3 mg of drospirenone) for 2 years was admitted to our hospital with chest pain. Her past medical history revealed no coronary risk factors except for smoking. No hemodynamic instability was noted at admission. The admission electrocardiogram revealed slight ST elevations in D1 and aVL leads. An urgent coronary angiography showed distal occlusions in the right coronary, left anterior descending, first diagonal, and left circumflex coronary arteries. Unfractionated heparin and abciximab were administered during the procedure, with the latter continued for 12 hours after the procedure. During the hospital course, the patient complained of recurrent anginal attacks. A repeat coronary angiography demonstrated the persistence of thrombotic occlusions. After 24 hours, she experienced chest pain, and her electrocardiogram revealed diffuse ST elevations with a blood pressure of 60/40 mm Hg. She was urgently transferred to the catheterization laboratory. Multiple balloon inflations with intracoronary alteplase (10 mg over 5-10 min) injections failed to restore coronary flow, and she developed cardiovascular collapse. Despite maximal mechanic and mechanical support, she passed away.

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Keywords: *Myocardial infarction; Contraceptives, oral, combined; Coronary thrombosis*

Introduction

Acute myocardial infarction (MI) due to multiple coronary vessel occlusions is very rare.[1,2] Herein, we report a fatal case of a 53-year-old woman suffering from acute coronary syndrome due to distal thrombotic occlusions in the right coronary, left anterior descending, first diagonal, and left circumflex coronary arteries.

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Figure 1. The admission electrocardiogram shows slight ST elevations in D1 and aVL derivations.

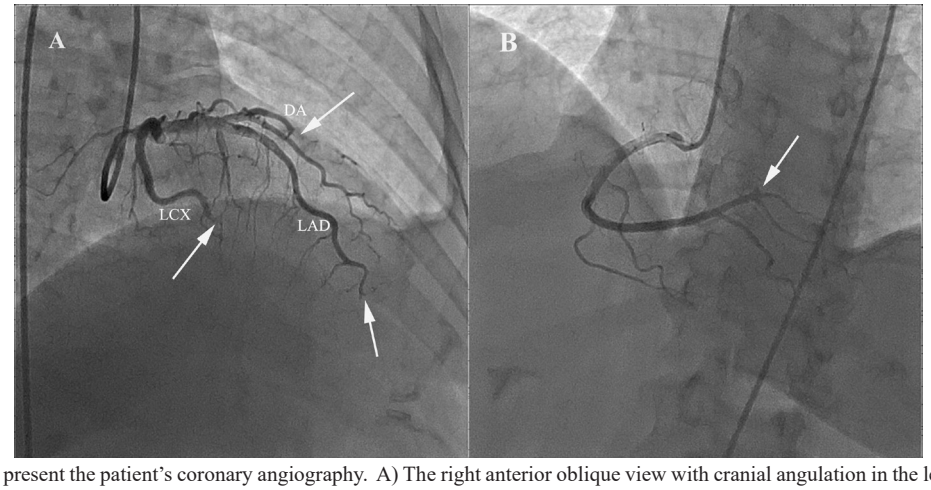

Figure 2. The images present the patient's coronary angiography. A) The right anterior oblique view with cranial angulation in the left coronary angiography shows distally occluded LAD, LCX, and DA coronary arteries (white arrows). B) The left anterior oblique view with cranial angulation in the right coronary angiography shows a distal occlusion in the right coronary artery (white arrow).
LAD, Left anterior descending artery; LCX, Left circumflex artery; DA, Diagonal artery

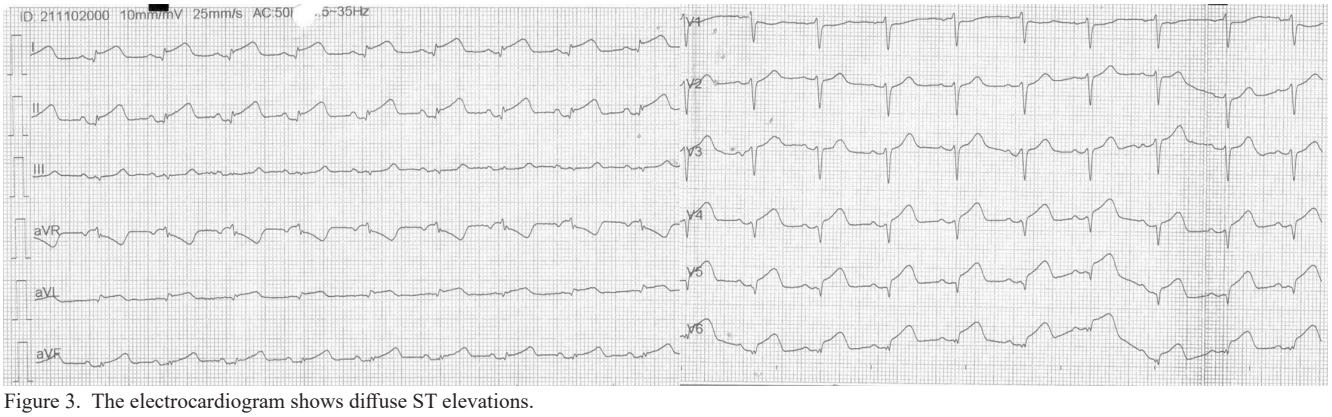

Figure 3. The electrocardiogram shows diffuse ST elevations.

Case Report

A 53-year-old woman was hospitalized with a diagnosis of ST-elevation MI. The patient had a 2-year history of using a combination of an oral contraceptive (OCS) and Yasmin (30 µg of ethinyl estradiol and 3 mg of drospirenone). She had no coronary artery disease risk factors except for smoking for 30 years. Transthoracic echocardiography showed neither wall motion abnormalities nor aortic dissection in the proximal segments of the aorta. Her electrocardiogram (ECG) demonstrated slight ST elevations in D1 and aVL derivations (Figure 1), and her blood pressure was 130/70 mmHg. Her initial laboratory tests revealed a glucose level of 114 mg/dL, a creatinine level of 0.7 mg/dL, a total cholesterol level of 198 mg/dL, a triglyceride level of 52 mg/dL, a high-density lipoprotein cholesterol level of 42 mg/dL, a low-density lipoprotein cholesterol level of 136 mg/dL, and a high sensitivity troponin T level of 31.8 pg/mL (peak =3826 and normal range =3-14). Acetylsalicylic acid (300 mg) and loading-dose ticagrelor (180 mg) were administered. An urgent coronary angiography illustrated distal occlusions in the right coronary, left anterior descending, first diagonal, and left circumflex coronary arteries (Figure 2A/B).

Unfractionated heparin (100 IU/kg) and a bolus dose of abciximab (0.25 mg/kg) were administered during the procedure. Because the patient was clinically stable, antiplatelet therapy with an abciximab infusion (0.125 µg/kg/min) for 12 hours was given without other coronary interventions. Metoprolol (50 mg daily), ramipril (5 mg daily), and atorvastatin (80 mg daily) were administered additionally. During the follow-up, she experienced chest pain, and her ECG showed diffuse ST elevations (Figure 3). A repeat coronary angiography showed the persistence of the thrombosis in the abovementioned coronary arteries. Because of the patient's clinical stability and the absence of evidence-based interventional treatment options, we chose medical therapy and a meticulous follow-up. Nonetheless, after 24 hours, she experienced chest pain, her ECG revealed diffuse ST elevations, and her blood pressure was 60/40 mm Hg. The patient was urgently transferred to the catheterization laboratory for coronary angiography. Multiple balloon inflations with intracoronary injections of alteplase (10 mg over 5-10 min) failed to restore coronary flow in these culprit vessels, and she developed cardiovascular collapse. Despite maximal mechanic and mechanical support, the patient expired.

Discussion

OCSs, containing different types and dosages of estrogen and progestin, are used for birth control. Although their use can be associated with some adverse effects, such as deep vein thrombosis and stroke, the association between MI and OCS use remains controversial. In a previous study, the use of combined OCSs was not associated with an increased risk of MI.[3]

Drospirenone-containing OCSs and the risk of MI

Yasmin is a new-generation OCS containing low-dose estrogen (ethinyl estradiol) and drospirenone. Drospirenone, as a progestogen, has antimineralocorticoid and antiandrogenic properties and reduces the androgenic and metabolic side effects of estrogen. Drospirenone reduces body weight, blood pressure, and low-density lipoprotein, and these favorable effects render the determination of the MI risk directly related to the use of drospirenone-ethinyl estradiol a challenge.[4]

The combination of ethinyl estradiol and drospirenone is considered more reliable concerning the risk of MI; nevertheless, there have been some cases of MI associated with the use of drospirenone-ethinyl estradiol. Furthermore, in another study, women on oral contraception Yasmin who underwent coronary intervention had a lower postprocedural complete ST resolution and a worse left ventricular function.[2] In that study, Yasmin was also an independent predictor of a high-grade thrombus burden. In contrast, 2 comprehensive, independently conducted, prospective, comparative cohort studies reported that the risk of adverse cardiovascular outcomes for Yasmin did not differ from that associated with the use of other OCSs.[5,6]

Case reports on Yasmin and MI

The cause of MI in OCS users is thrombotic and not atherosclerotic. The literature contains 3 case reports on Yasmin and MI but lacks information on the simultaneous occlusion of more than 3 epicardial coronary arteries. The simultaneous total occlusion of 2 coronary arteries (the left anterior descending and circumflex coronary arteries) was reported by Atmaca et al.[7] In the reports of Orti[8] and Kocabay,[9] the culprit lesion was confined to 1 coronary artery. Currently, no guideline-based therapy exists for patients who develop MI during OCS use. In the case published by Orti et al,[8] the patient presented with anterior wall MI and received treatment with systemic fibrinolysis with tenecteplase. In another case, the diagnosis of the patient was acute anterolateral MI, treated with stenting for both coronary arteries and a tirofiban infusion.[7] Kocabay et al[9] used an intracoronary tissue plasminogen activator injection for the occluded left anterior descending coronary artery. They also used heparin with the tirofiban infusion for 48 hours. In our case, because our center has the capability of percutaneous coronary intervention within 24 hours, we did not use systemic thrombolysis. Unfortunately, we could not perform thrombus aspiration as the catheter was not available

at that time. Although current guidelines discourage routine thrombus aspiration techniques, thrombus aspiration might be useful in such a case with a high thrombotic burden. We think that our patient suffered recurrent thrombotic occlusions accompanied by coronary artery spasms during her hospital course.

Coagulation abnormalities in OCS users

The role of prothrombotic mutations, such as factor V Leiden and prothrombin G20210A mutation, in MI is far from clear. Still, patients with a history of OCS use presenting with acute coronary syndrome should be investigated for the presence of prothrombotic mutations and coagulation abnormalities.[10] We ruled out these mutations in our patient with genetic analysis. We also investigated abnormalities related to hypercoagulable status and examined protein C, protein S, fibrinogen, and homocysteine levels. The clotting and lupus anticoagulant tests all returned normal, and there was also no history of previous thromboembolic venous disease.

Paradoxical embolism

Patients presenting with thrombotic occlusions should also be screened for other secondary thrombosis reasons, such as patent foramen ovale or atrial septal defect, with transesophageal echocardiography. Because our initial echocardiographic examination was normal, we did not perform transesophageal echocardiography.

Conclusion

In patients taking OCSs, cigarette smoking can lead to more serious side effects, including MI, stroke, and venous thromboembolism. The presented case highlights the challenge of managing intracoronary thrombi. It has been suggested that older smokers have a constant risk of MI. Therefore, female smokers should not continue OCS use after age 35. Unfortunately, our patient was taking Yasmin for menstrual irregularity without a prescription.

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