Clinical Case Report

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Multiple arterial thromboses due to cystic medial degeneration Erdheim-Gsell

A case report

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Abstract

Rationale: Cystic medial degeneration Erdheim-Gsell is a vascular pathology mainly of the large vessels, which is mostly associated with Marfan syndrome or Ehlers-Danlos syndrome. The clinical findings of this entity are aneurysms of the aorta or large peripheral arteries which usually present in an acute setting due to rupture of an aneurysm.

Patient concerns: We present a case of a 43-year-old Caucasian male with histologically proven cystic medial degeneration of the lower limb vessels mimicking peripheral artery occlusive disease. Despite antiplatelet and anticoagulant treatment, the patient suffered multiple vascular stenosis and occlusions.

Diagnoses: Multiple arterial stenoses and thromboses leading to peripheral artery occlusive disease caused by cystic medial degeneration Erdheim-Gsell.

Interventions: Multiple surgical and endovascular interventions including bypass graft and intra-arterial thrombolysis as well as oral antiplatelet and anticoagulant therapy.

Outcome: Despite dual antiplatelet therapy, anticoagulant therapy with rivaroxaban and multiple surgical and endovascular interventions, the patient developed recurrent arterial thromboses. The patient did not suffer further thrombotic events since clopidogrel and phenprocoumon were administered.

Lessons: Clinical presentation of cystic medial degeneration Erdheim-Gsell mimicking peripheral artery occlusive disease is very unusual. Due to the fragile vessel wall, patients with cystic medial degeneration might have a higher risk to develop arterial thromboses, even under antiplatelet therapy or anticoagulant treatment.

Abbreviation: MR = magnetic resonance.

Keywords: arterial thrombosis, cystic medial degeneration Erdheim-Gsell, intra-arterial thrombolysis, peripheral artery occlusive disease, procoagulant state

1. Introduction

Cystic medial degeneration Erdheim-Gsell affects mostly large vessels like the aorta and presents itself commonly with aneurysms in a highly acute setting with rupture of these aneurysms. There are associations to Marfan syndrome or Ehlers-Danlos syndrome[1] but the etiology of this rare degenerative vascular pathology is still unknown. In this case report, we present a patient with cystic medial degeneration Erdheim-Gsell mimicking peripheral artery occlusive disease. This clinical presentation with claudication and ischemic symptoms as well as morphological findings including arterial stenosis and occlusions are very unusual and novel for Erdheim-Gsell disease.

2. Case

A 43-year-old Caucasian male underwent a peripheral transcutaneous angioplasty and stenting of the popliteal artery due to an ischemia of the right lower limb. A digital subtraction angiography revealed a relevant stenosis of the popliteal artery which was treated with stent insertion (Fig. 1A and B). The patient was nonsmoker but obese with a body mass index of 30 kg/m^2. No other vascular risk factors were present. Despite the endovascular treatment with stenting of the popliteal artery and the initiation of an oral antiplatelet therapy with 100 mg acetylsalicylate and 75 mg clopidogrel daily, the patient presented again with a recurrent ischemia of the right lower limb only 4 weeks after the initial treatment. The reason for his complaints

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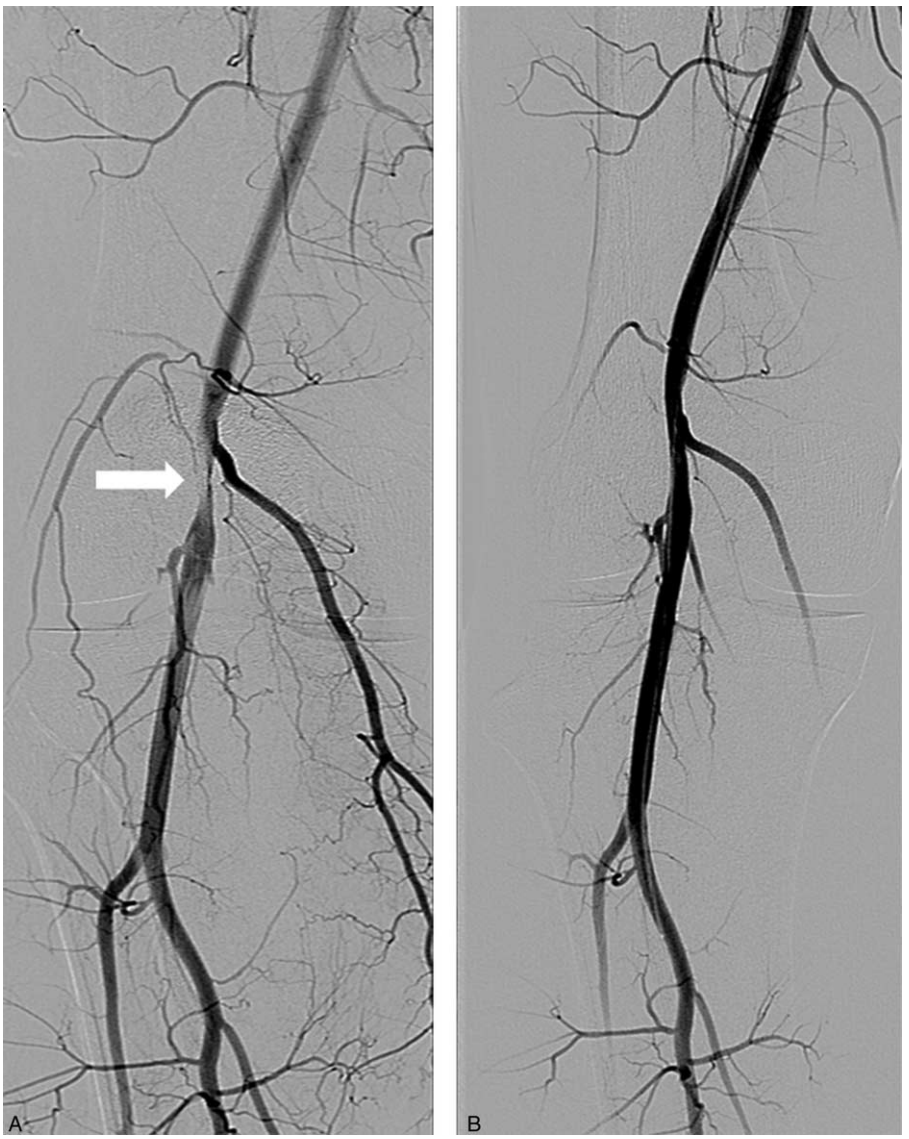

Figure 1. Digital subtraction angiography of the right popliteal artery. (A) Arrow points toward a high-grade stenosis. (B) Right popliteal artery after angioplasty and stenting.

was an occlusion of the popliteal stent, which was successfully treated with a second angioplasty. Only 1 month later, the patient was readmitted to our department with massive ischemic symptoms of the same leg. This time, the occlusion was surgically treated with a stent removal and an implantation of a femoropopliteal bypass graft with an autologous vein. One day after that surgery the patient had massive ischemic symptoms due to an occlusion of the bypass graft. Thrombotic material was surgically removed. Histopathological analysis of the anastomosis revealed only minimal atherosclerotic changes in the arteries and degenerated vessel walls of the veins and arteries which were fragmented by a mucoid substance. That mucoid substance showed a clear blue coloring in Alcain stain. Those morphological alterations were in accordance with a cystic medial degeneration Erdheim-Gsell. A postoperative magnetic resonance (MR) angiography of the aorta and lower extremities revealed only minimal circular stenoses of the bypass anastomoses with no abnormalities in the aorta or other arteries. Acetylsalicylate 100 mg daily was continued as antiplatelet therapy for the following four years.

Within the next 4 years after the bypass surgery, the patient developed claudication of the right lower limb with a painless walking distance of approximately 100 m. However, the annually performed MR angiography imaging of the lower limb arteries was without pathological findings. In contrast to the MR, color-coded duplex ultrasonographies revealed a decreasing arterial perfusion. The claudication was treated symptomatically with intravenous prostaglandine infusions. One month after the prostaglandine infusions, the patient suffered an incomplete ischemia of the right leg. MR angiography and color-coded duplex ultrasonography revealed an occlusion of the right superficial femoral artery and the bypass graft as well as stenoses of the popliteal artery and tibioperoneal trunk (Fig. 2). Due to the morphology an intra-arterial thrombolysis was performed. The thrombolysis-catheter was placed in the thrombus material at the bypass graft. Overall, 50 mg alteplase and 30,000 IU heparin

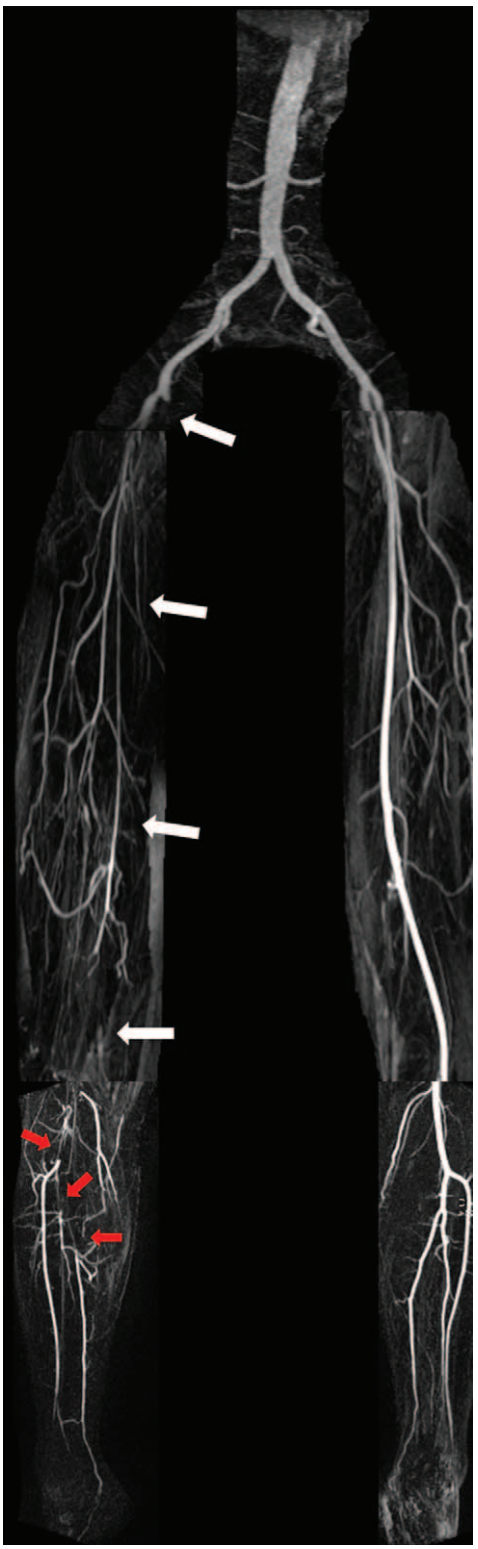

Figure 2. Magnetic resonance angiography of the aorta, iliacal, and leg arteries. The white arrows point to the occluded bypass graft of the right leg. Red arrows point to stenoses of the right popliteal artery and tibioperoneal trunk. There are no aortal or iliacal aneurysms.

were administered via the catheter. The thrombolytic therapy was successful but an aneurysm of the distal bypass anastomosis was detected in the final angiography. That aneurysm had a diameter of 1.1 cm, was well perfused, and the patient had no limitations

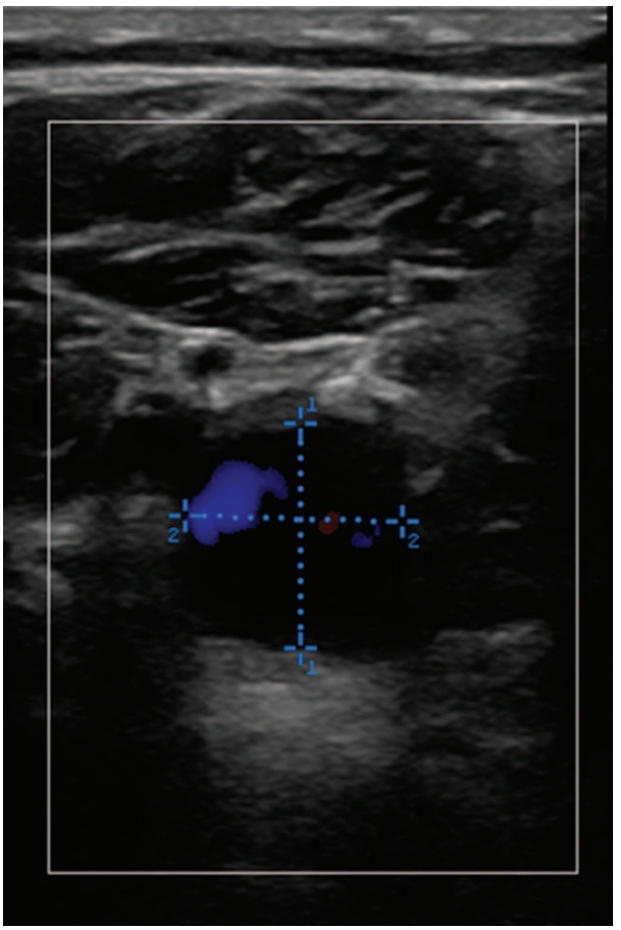

Figure 3. Color-coded duplex ultrasonography of the bypass graft's aneurysm with a size of 1.4 × 1.35 cm.

due to the popliteal aneurysm. Therefore the patient underwent no surgical treatment and was discharged with anticoagulant treatment (rivaroxaban 20 mg once daily) as well as due to elevated low-density cholesterol with statin treatment (atorvastatin 40 mg once daily). Two months later, a color-coded duplex ultrasonography control showed an increase of the popliteal aneurysm with a diameter of 1.4 cm (Fig. 3) and the patient described claudication in the right leg again. A surgical treatment of the popliteal aneurysm was successfully performed.

One year after the surgical treatment, the patient was admitted again to our department due to massive ischemic symptoms of the right leg. He described a walking distance of only 20 m. His medication has not changed since the dismissal 2 years before. A MR angiography revealed a thrombotic reocclusion of the bypass graft, so intra-arterial thrombolysis with an overall administration of 50 mg alteplase and 36,000 IU heparin was performed again successfully (Fig. 4A). A dissection of the proximal bypass anastomosis was treated with a Cordis Smart Stent 6/40 (Fig. 4B). Unfractionated heparin was given for the next 5 days and was then changed to an oral anticoagulation with phenprocoumon due to a bypass occlusion under rivaroxaban treatment. Additionally, clopidogrel 75 mg once daily was added as an antiplatelet therapy.

3. Discussion

Cystic medial degeneration Erdheim-Gsell is a rare vascular pathologic finding, which is mostly associated with aneurysms in

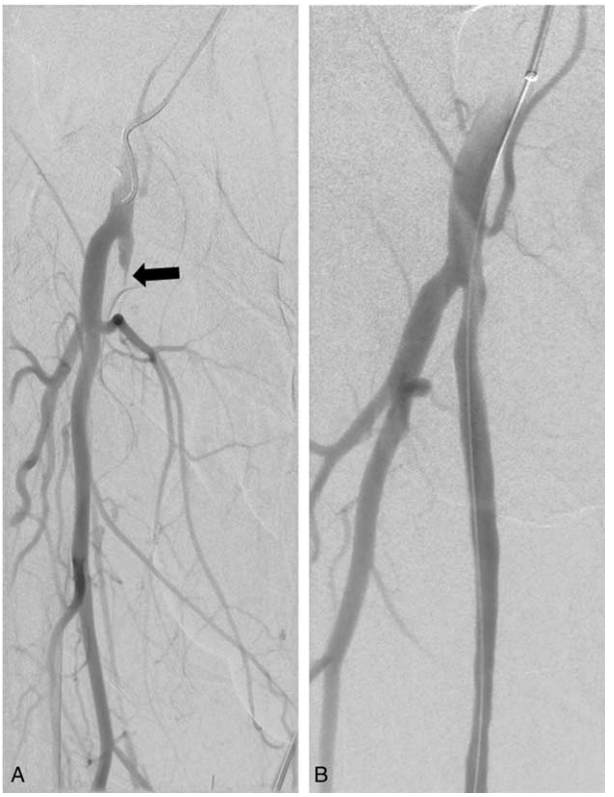

Figure 4. (A) Digital subtraction angiography of the right superficial femoral artery before and (B) after intra-arterial thrombolysis. Arrow points toward the occluded bypass graft.

the aorta or its branches, but there are reports that other vessels can also be affected.[2–5] The etiology is still unknown. However, in literature there are associations to Marfan syndrome and Ehlers-Danlos syndrome described so far.[1] This patient had no clinical findings of Marfan syndrome, Ehlers-Danlos syndrome or Loeys-Dietz syndrome and there was no evidence for hereditary aortic or connective tissue diseases. The patient's clinical presentation was very unusual because he presented with claudication mimicking peripheral artery occlusive disease. Interestingly, the aorta remained unaffected and only the right leg vessels showed alterations with stenosis and further with 1 aneurysm. To the best of our knowledge, this is the first reported case of cystic medial degeneration Erdheim-Gsell mimicking peripheral artery occlusive disease and only affecting the vessels of 1 lower limb. Inoue et al reported a similar case of a patient with intermittent claudication, but due to a popliteal cystic adventitial degeneration.[6]

The treatment of arterial occlusions consists of endovascular as well as surgical methods and our patient was also treated with both. However, the treatment of the patient was complicated due to multiple reocclusions of the superficial femoral artery and the bypass graft as well. The cause of these recurring thrombi is not entirely clear. The patient claimed that he took the prescribed medication daily. Thus, one possible cause of the early reocclusions might be the resistance to acetysalicylate and clopidogrel treatment. A meta-analysis reported a mean prevalence of laboratory acetysalicylate resistance of approximately 25% and approximately 30% of patients are clopidogrel non-responders.[7,8] Unfortunately, platelet aggregometry was not performed. Acetysalicylate was then changed to rivaroxaban which showed in an anti-factor Xa assay a good effectiveness, but even with that anticoagulant therapy, the patient developed thrombus formation in the bypass graft. One further cause could be the underlying vascular Erdheim-Gsell disease. So far, there are no data whether patients with cystic medial degeneration have an increased thrombogenic risk. However, the fragile vessel wall might cause easier thrombi formation. It will be shown in the future if the combination of clopidogrel and phenprocoumon is successful in our patient.

Interestingly our patient also developed an aneurysm of the bypass graft, which was surgically removed. This fact goes along with typical findings in patients with cystic medial degeneration. However, it might also be a complication after catheter intervention. This complication is rare and occurs in 2% to 6% of patients treated[9] but the risk might be increased in patients with cystic medial degeneration.

4. Conclusion

The clinical presentation of cystic medial degeneration Erdheim-Gsell mimicking peripheral artery occlusive disease is very unusual and extremely rare. Patients with cystic medial degeneration might have a higher risk to get reocclusions and thrombi after treatment (endovascular and surgical), even under antiplatelet therapy or anticoagulant treatment, probably due to the vulnerable vessel wall.

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