Thromboangiitis Obliterans (Buerger's disease): A Case Report

Aadhar Oli[1], Shila Poudel[1], Sandeep Raj Pandey[2]

[1]*Department of Internal Medicine, Norvic Internatinal Hospital, Thapathali, Kathmandu, Nepal*

[2]*Department of Vascular Surgery, Annapurna Neurological Institute & Allied Sciences, Maitighar, Kathmandu, Nepal*

CORRESPONDENCE

Dr. Aadhar Oli
Department of Internal Medicine, Norvic International Hospital, Kathmandu, Nepal
E-mail: adhar.olee@gmail.com
ORCID ID: https://orcid.org/0009-0005-3372-0455

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ABSTRACT

Thromboangiitis obliterans (TAO) is an occlusive vascular disease characterized by segmental nonatherosclerotic inflammatory disorder of the small and medium arteries, veins, and nerves of the upper and lower extremities. Also known as Buerger's disease it is frequently found in men who smoke. Tobacco smoking is central to the initiation and progression of the disease. Here we present a case of a 56- years-old male smoker with complaints of numbness, pain, and discoloration of digits in his right leg for 1 year.

Keywords: Thromboangiitis obliterans; Buerger's disease; Non-atherosclerotic inflammation; Tobacco smoking.

INTRODUCTION

Thromboangiitis obliterans (TAO) is a segmental nonatherosclerotic inflammatory disorder that involves the small and medium arteries, veins, and nerves of the extremities primarily.[1] In 1879 Von Winiwarter provided the first description of a patient with thromboangiitis obliterans. But it was Leo Buerger who published a detailed description of the pathological findings in patients with the disease in 1908, hence the name Buerger's disease.

Beurger's disease is more prevalent in the Middle East and the Far East, typically in male patients < 50 years of age who smoke[2] (<45 years in earlier studies).[1] Men are more commonly affected than women. Of patients diagnosed with TAO, 70 to 91 percent are male and 11 to 30 percent are female.[3] However there have been reports of increasing incidence of the disease in women, possibly due to an increase in cigarette smoking among women.[4]

Cigarette smoking has been clearly implicated as the main etiology of the disease. A clear relation between cigarette smoking and initiation, exacerbation, and remission of the disease has been established.[5,6] Although cigarette smoking is implicated as the main culprit, Buerger's disease has been reported in cigar smokers, marijuana users, and those who use smokeless tobacco such as chewing tobacco and snuff.[4,7,8] Herein, we report a case of 56 years old male with Buerger's disease who presented with gangrene of all the digits of the right lower limb and highlight the pathophysiology, clinical features, imaging, and medical management of the disease.

CASE REPORT

56-year-old male smoker with a 1-year history of numbness, pain, and discoloration of the right greater, 2nd, and 3rd toe presented with right lower leg discomfort and blackish discoloration of all 5 digits of the lower limb. On examination, the patient had blackish ischemic gangrenous tissue on his right foot. (Figure 1) The right femoral, popliteal, and pedal pulses were palpable. Ankle: brachial indices were normal.

Preliminary blood work-up (complete blood count, electrolyte, creatinine, glucose, C-reactive protein level) was within the normal range. Serological tests for immunological markers and autoantibodies were normal or negative. The hematological evaluation did not identify any hypercoagulable state. Echocardiography was also done to rule out cardiac sources of embolism. Arterial doppler of his right lower limb revealed hypoechoic plaque within the right common iliac artery causing 70% stenosis and no flow within the proximal superficial femoral artery. (Figure 2) Computed tomography angiography revealed variable stenosis of the right internal iliac artery, and right external iliac artery with marked stenosis (90%) in the middle third segments of both arteries. Complete occlusion of the right superficial femoral artery was also noted along with the narrow caliber of the right popliteal artery and anterior, and posterior tibial artery. The dorsalis pedis artery was normal. (Figure 3) The diagnosis was made on the basis of the exclusion of other similar conditions and the presence of typical clinical and radiological features. The patient underwent a below-knee amputation and was advised for smoking cessation.

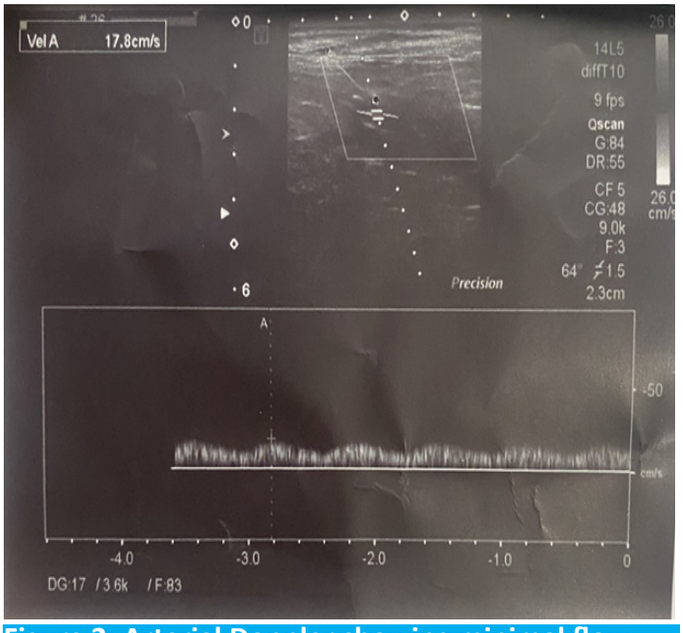

Figure 2: Arterial Doppler showing minimal flow through the right Iliac artery with a hypoechoic plaque.

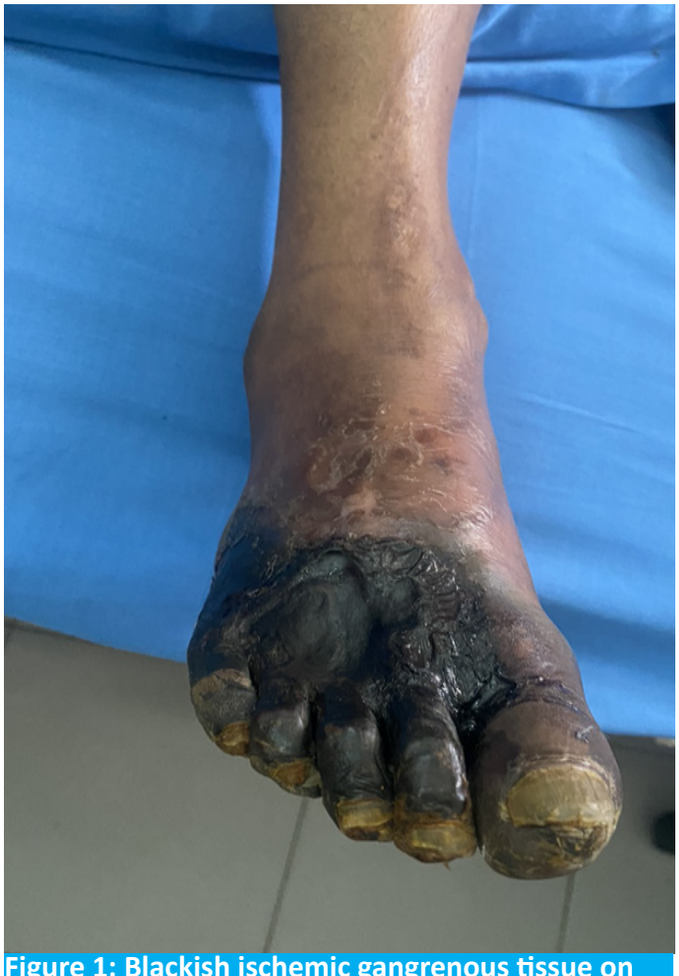

Figure 1: Blackish ischemic gangrenous tissue on the right foot

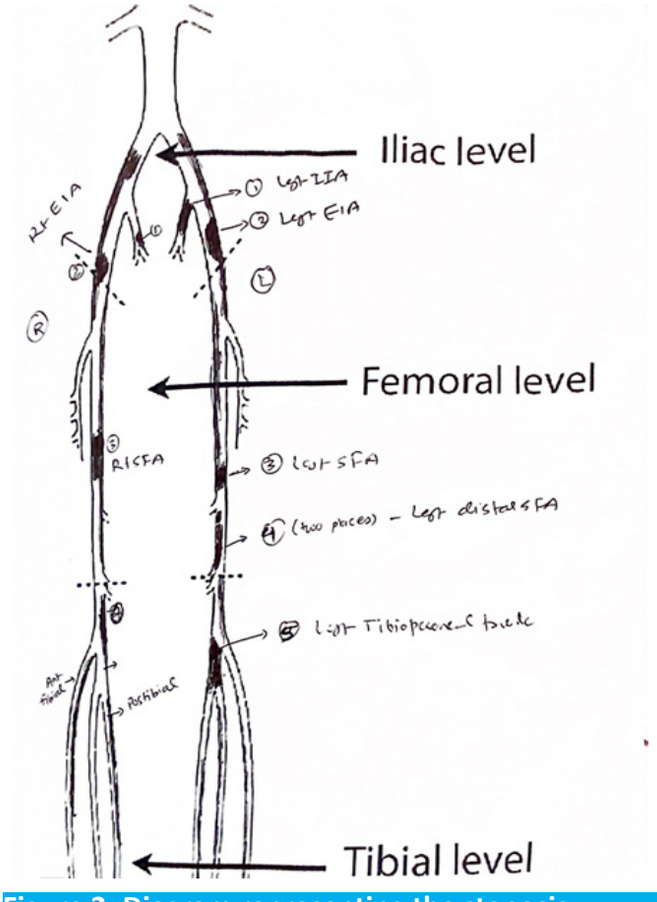

Figure 3: Diagram representing the stenosis observed in the right internal iliac artery, right external iliac artery, right superficial femoral artery, and anterior, and posterior tibial artery.

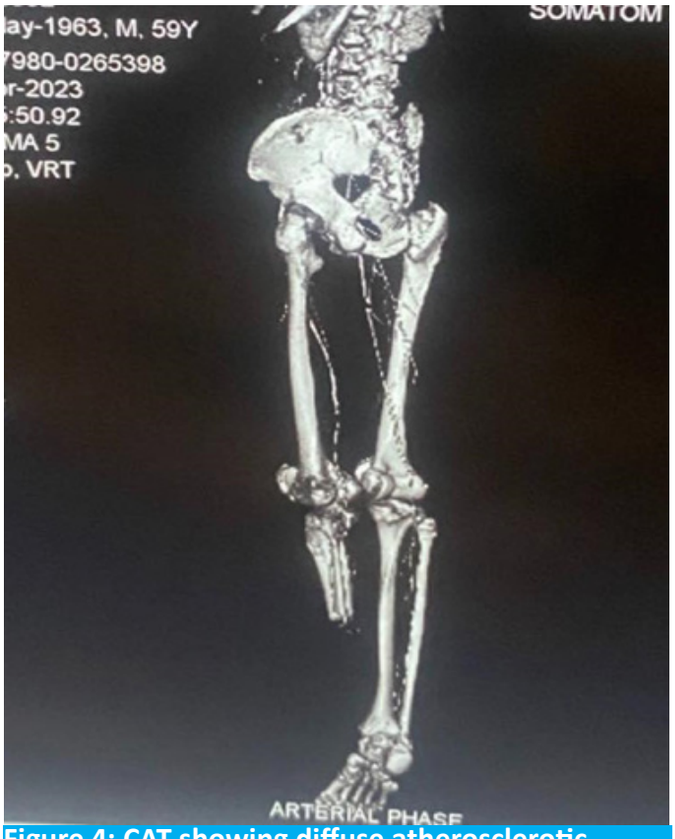

Figure 4: CAT showing diffuse atherosclerotic occluions of tibiaal vessels.

DISCUSSION

Since the reporting of the first case of Beurger's disease in 1908, little progress has been made in the understanding of the cause, pathophysiology, and optimum treatment of patients.[9] TAO is a segmental inflammatory, nonatherosclerotic, occlusive vascular disease that affects the small and medium-sized arteries and veins of the upper and lower extremities. TAO is histologically distinguished from other forms of vasculitis by a highly cellular, inflammatory intra-luminal thrombus with relative sparing of the luminal wall. Three pathophysiological phases of TAO have been described: Acute, subacute, and chronic.[1] The acute phase is characterized by a highly cellular occlusive thrombus consisting of CD3 (+) T-cells, CD 20 (+) B-cells, polymorphonuclear neutrophils, and giant cells. In the chronic phase, inflammation is no longer present and organized thrombus and vascular fibrosis remain. The internal elastic lamina is intact in all three phases which differentiates it from atherosclerosis and other vasculitides.

Tobacco smoking is considered a major risk factor for TAO. Even though the exact pathophysiology is still unknown, it is well documented that the cessation of smoking leads to the remission of the disease.[1,4,5] The role of inflammatory and immunologic pathogenesis (T-cell mediated immune inflammation of the intima),[10,11] endothelial dysfunction (high titers of anti-endothelial cell antibodies),[12] genetic component (higher frequency of HLA-DR4)[6] and prothrombotic factors (prothrombin gene mutation, anticardiolipin antibodies)[1,13,14] have all been reported.

TAO is mostly reported in male smokers < 50 years of age.[2] It usually involves the distal arteries and vein which leads to digital (toe, finger) ischemia. Involvement of the large arteries (aorta and iliac artery) is unusual.[15,16] The obliterative lesion of the iliac artery might be due to a direct proximal progression of thromboangiitis obliterans of the femoral artery or to a skip progression of the disease.[15] (As in our case) TAO also may involve cerebral, coronary, internal thoracic, renal, and mesenteric arteries apart from small and medium arteries of the extremities.[17,18] Patients usually complain of pain and discoloration of the involved digits. As the disease progresses calf claudication and eventually ischemic pain at rest and ischemic ulceration, gangrene on digits may develop. Patients also may initially develop migratory superficial thrombophlebitis even before the signs and symptoms of ischemia develop.[4] Patients usually complain of tender nodules that follow the venous distribution.[4] Cold insensitivity/Raynaud phenomenon is reported in more than 40% of patients.[4]

Diagnosis of TAO is predominantly clinical. Several diagnostic criteria have been proposed but are less commonly used.[19] The traditional diagnosis of Buerger's disease is based on all of the following 5 criteria being present, though not universally accepted.[2,19–21]

1. Smoking history
2. Onset before the age of 50 years
3. Infrapopliteal arterial occlusions
4. Either upper limb involvement or phlebitis migrans
5. Absence of atherosclerotic risk factors other than smoking.

Physical examination in patients (detailed vascular examination with palpation of peripheral pulses, auscultation for arterial bruits, measurement of ankle/brachial indices, an inspection of superficial venous nodules, and evidence of ischemia with suspected TAO aid in establishing the diagnosis. Though a normal ankle-brachial index (ABI) or wrist-brachial index (WBI) doesn't exclude the diagnosis of TAO, because of involvement of only distal vasculature.

Computed tomographic, magnetic resonance, or invasive contrast angiography also plays a vital role in establishing the diagnosis of TAO. Arteriographic features suggestive of TAO include the following:[1,22,23]

1. Involvement of small and medium-sized vessels

2. Absence of Atherosclerosis
3. Segmental occlusion
4. Presence of Corkscrew collaterals
5. No evidence of thromboembolism

A biopsy is not commonly indicated in all patients but is the only means to establish a definitive diagnosis.[1] There are no specific laboratory tests to diagnose TAO. Laboratory studies are used to exclude alternate diagnoses. A complete blood count, metabolic panel, liver function tests, fasting blood glucose, inflammatory markers such as erythrocyte sedimentation rate and C-reactive protein, complement measurements, cryoglobulins, serological markers of autoimmune disease, including antinuclear antibody, anticentromere antibody, Rheumatoid factor, and anti-SCL-70 antibody, coagulation tests, antiphospholipid antibodies (anticardiolipin antibodies, beta 2 glycoprotein, anti-serine antibodies, and lupus anticoagulant) protein C, protein S, antithrombin, factor V Leiden, and prothrombin gene mutation should be done. These tests are usually normal or negative. However, lupus anticoagulants and anticardiolipin antibodies may be positive in some cases.[14]

Cessation of smoking tobacco and any other tobacco product is the only definitive treatment in TAO.[1,9] Cessation of tobacco smoking has been found to stop the progression of the disease and reduce the risk of amputation.[24,25] It is of paramount importance to educate the patients regarding the association of TAO with smoking. Use of other adjunctive measures like enrolling into a smoking cessation group, and pharmacological aid with Varenicline, or Bupropion can also be used. Nicotine replacement therapy should be avoided as it may contribute to continued disease activity.[26]

Additional medicinal therapeutic measures established in the treatment of TAO include intermittent pneumatic compressions[27] and vasodilators like Prostaglandin analogs (iloprost), Phosphodiesterase inhibitors (Cilostazol, Sildenafil), and Calcium channel blockers (Nifedipine).
Surgical revascularization is a potential option but is usually not possible in TAO due to the involvement of distal vasculature.[28,29] In select patients with severe ischemia and suitable distal target vessels arterial bypass surgery can be considered but have suboptimal outcomes.[1] Peripheral periarterial sympathectomy, epidural spinal cord stimulation, and therapeutic angiogenesis have been used as adjunctive but have limited data to support their efficacy.[30–34]

CONCLUSION

The diagnosis of TAO is predominately clinical. It is important to recognize the signs and symptoms to diagnose the disease early to prevent disease progression and amputations. Smoking cessation has been universally accepted as the definitive treatment to stop the progression of the disease. Therefore educating patients regarding smoking cessation is paramount. Due to the rarity of the disease, there are obvious gaps in understanding the course of the disease and its management. Therefore further studies have to be done to facilitate early diagnosis and treatment of TAO.

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