

# Buerger's disease or thromboangiitis obliterans: description of two cases

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## Abstract

Buerger's disease, or thromboangiitis obliterans (TAO), is a segmental non-atherosclerotic occlusive inflammatory condition of small arteries and veins of the upper and lower extremities, characterized by thrombosis and recanalization of the affected vessels.

It is triggered by substantial exposure to tobacco, especially in males aged from 20 to 50.

Currently, the most effective treatment, together with the suspension of the smoking habit, is represented by prostacyclin infusion (Iloprost).

We described two cases of Buerger's disease recently presented to our observation, with some different clinical features and therapeutic pathways.

## Introduction

Buerger's disease, or thromboangiitis obliterans (TAO), is a segmental non-atherosclerotic occlusive inflammatory condition of small arteries and veins of the upper and lower extremities, characterized by thrombosis and recanalization of the affected vessels.<sup>1</sup>

TAO was described for the first time by von Winiwarter in 1879 but the detailed description was provided by Leo Buerger in 1908.<sup>2,3</sup>

It is triggered by substantial exposure to tobacco, especially in

males aged 20 to 50. It is more prevalent in the Middle East and Asia than in North America and Western Europe.<sup>4</sup>

The prevalence among smokers is reported to range from values as low as 0.5 to 5.6% in Western Europe to values as high as 45 to 63% in India, 16 to 66% in Korea and Japan and 80% among Ashkenazi Jews.<sup>1,5</sup>

The clinical criteria for the diagnosis of Buerger's disease were proposed by Shionoya in 1998; they include: i) smoking history; ii) onset before the age of 50; iii) infra-popliteal arterial occlusions; iv) either upper limb involvement or phlebitis migrans; v) absence of atherosclerotic risk factors other than smoking. The diagnosis may be made only if all five requirements have been fulfilled.<sup>6</sup>

Patients affected by TAO usually show the following features: gangrene, acral ulcer, ischemic rest pain, subungual and skin infection, phlegmons, (in-step-) claudication, acral skin discoloration and coldness, Raynaud's phenomenon (RF), thrombophlebitis nodules or strings (often migratory).<sup>5</sup>

Superficial thrombophlebitis and RF may occur in approximately 40% of patients with TAO; RF often continues after complete cessation of tobacco usage.<sup>7</sup>

The first step is represented by human vascular endothelial cells injury, which leads to arterial inflammation, thrombosis and hyperplasia.<sup>8</sup> In addition, activation of the endothelial NFkB-iNOS-NO pathway, followed by excessive release of nitric oxide (NO) and vasospasm, due to local endothelial dysfunction, plays an important role in the alteration of the vascular structure and function.<sup>9,10</sup> Unlike other forms of vasculitis, the structure of the affected vessel, especially the internal elastic lamina, remains intact in TAO.<sup>11</sup>

In the initial phase of inflammation, the polymorphonuclear leukocytes are principally detected, forming micro-abscesses in the thrombus, subsequently surrounded by a granulomatous inflammation; the final step is characterized by a vascular fibrosis.<sup>12</sup> However, vessel biopsy is generally not indicated.

No specific laboratory tests are available to confirm the diagnosis of TAO.

If a proximal source of embolization is suspected, transthoracic or transesophageal echocardiography and arteriography should be performed. Angiographic findings include severe distal segmental occlusive lesions. The more proximal arteries are normal.<sup>1</sup>

As far as management is concerned, smoking cessation represents undoubtedly the main feature, also to prevent further vascular complications. Surgical revascularization attempts generally do not obtain appreciable results.<sup>13</sup> The efficacy of sympathectomy is not yet sufficiently documented;<sup>14</sup> however, it seems to correlate with smoking cessation.<sup>15,16</sup>

In a small number of patients, a good improvement was achieved by the autologous implantation of bone marrow-derived stem cells,<sup>17-19</sup> in 7 of them associated with hyperbaric oxygen therapy.<sup>17</sup> Spinal cord stimulator has also been used experimentally in patients with TAO with promising results.<sup>20</sup>

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Currently, the most effective treatment, together with the suspension of the smoking habit, is represented by prostacyclin infusion (Iloprost),<sup>21</sup> which proves to be more effective than lumbar sympathectomy.<sup>22</sup>

## Case Reports

We describe two cases of patients affected by Buerger's disease, recently presented to our observation.

### Case 1

Male patient, 33 years old, heavy smoker (20 cigarettes a day for 15 years), in March 2018 developed a clinical picture characterized by persistent itchy hands and RF. Biohumoral exams were all negative. Among the respiratory function tests, to be reported was a slight DLCO reduction; chest HRCT did not show significant alterations. Capillaroscopy highlighted a nonspecific microangiopathic pattern.

After a period of relatively good conditions, in December an acral cutaneous ulcer of the third finger of the right hand appeared. The patient underwent repeated medications of the ulcer with the advice to abolish the smoking habit.

For the persistence of the clinical picture, the patient was ad-



**Figure 1.** Angiography of the upper right limb: non-opacification of the palmar arch, which presents thin collateral circles from the ulnar and distal interosseous artery to the metacarpal branches of IV and V ray, with more slender gauge at I and II ray.

mitted to the Rheumatology Unit, where he was subjected to continuous infusion therapy with Iloprost (1 veal in 500 cc physiological solution, 15 cc/h for 7 days) and daily ulcer medications; he was also subjected to angiography of the right upper limb.

Radiological images highlighted: i) normal gauge and vascular opacification of the subclavian-humeral axis; ii) effective opacification of the humeral artery up to the forearm trifurcation; iii) the radial artery has a slender gauge at the origin, then it decreased up to occlusion at the distal third of forearm; iv) effective opacification of the interosseous artery up to the distal third; v) effective opacification of the humeral artery up to the distal third; vi) non-opacification of the palmar arch, which presented thin collateral circles from the ulnar and distal interosseous artery to the metacarpal branches of IV and V ray, with more slender gauge at I and II ray (Figure 1).

The cutaneous picture progressively improved, with clear demarcation of the ischemic-ulcerative lesion, in absence of pain and functional limitation of the fingers.

### Case 2

Female patient, 40 years old, at the beginning of January 2019, began to complain about lower extremity pain. After a few days, she showed ischemic lesion on the left toe and initial ischemic signs on the other ipsilateral fingers (Figure 2).

For this reason, the patient underwent angio-TC of lower limbs, which highlighted: *stenosis/occlusion of the tibial arteries bilaterally (in particular in the upper middle third the anterior tibial and in the lower third the posterior tibial) with the appearance of collateral circles, as a chronic picture* (Figure 3).

Angiography of the left lower limb showed: *anterior and posterior tibial arteries occluded at the origin; thin interosseous artery until malleolar level; low circulation of the foot.*



**Figure 2.** Ischemic lesion on the left toe of the female patient.

At our surgery, she underwent capillaroscopy, which excluded major alterations but highlighted the presence of diffuse microhemorrhages as a picture of chronic ischemic suffering.

The autoimmunity tests were negative. Radiological exams, aimed at evaluating possible vasculitis or neoplastic conditions, were also negative.

Due to the impossibility of performing a revascularization intervention, a left lumbar sympathetic gangliectomy was attempted, with subsequent reduction of pain and improvement of perfusion conditions.

The patient was then hospitalized and treated with continuous infusive prostanoids (iloprost), for seven days and daily medications of the digital ulcers. The patient was strongly invited to stop smoking habit.

A clear improvement of the lesions was achieved; the necrotizing manifestations have progressively reached a good marginalization, especially the second finger.

## Discussion and Conclusions

The cases described respond to the clinical characteristics of TAO, complicated by digital ulcerative lesions. Additional items of interest are represented, in the first patient, by Raynaud's phenomenon, which was present with capillaroscopic features of nonspecific microangiopathy; in the second, among the therapeutic attempts, by a lumbar sympathetic gangliectomy, followed by a temporary improvement.

In both cases, the treatment with continuous intravenous infusion with Iloprost and the frequent medications of the ulcerative lesions have proven to be very effective for obtaining a valid and persistent result.

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**Figure 3. A and B) Angio-TC of lower limbs: stenosis/occlusion of the tibial arteries bilaterally (in particular in the upper middle third the anterior tibial and in the lower third the posterior tibial) with the appearance of collateral circles, as a chronic picture.**

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