



## Pattern of vascular involvement in patients with critical limb ischemia secondary to TAO

### KEYWORDS

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**ABSTRACT** *Introduction: Thromboangiitis obliterans (TAO) is smoking related vasculopathy. Though traditionally described to be only a medium and small vessel disease, we do see patients with a more proximal pattern of disease in clinical practice. We undertook this study to relook at the site of vascular involvement in patients with critical ischemia secondary to TAO in our population.*

*Materials and methods: We performed a retrospective analysis of inpatient records of all patients over a 6 year period from 2005-2010 for the clinical presentation, interventions performed and outcome in patients diagnosed to have critical ischemia secondary to TAO.*

*Results: There were 1273 admissions for peripheral vascular disease of which TAO formed 11.9%. There was only one female patient in this series. The mean age of our patients at presentation was 37.8 years and the mean age since the start of the disease was 36.0 years (16-50). The mean smoking pack year was 15.39. Based on clinical examination and imaging, 5 (3.29%) patients had aorto-iliac disease, 6 (3.95%) patients had iliofemoral disease, 63 (41.4%) had femoro-popliteal disease and 78 (51.3%) had only tibial involvement. Eighty four (55.26%) patients presented with bilateral lower limb involvement. Twenty (28.4%) patients had upper limb involvement. Only 5 (3.29%) patients had recorded superficial thrombophlebitis.*

*Conclusions: The clinical presentation of thromboangiitis is not limited to distal disease in Indians. Patients with involvement of the more proximal segments may respond to revascularisation procedures.*

### Introduction

It was Leo Buerger's description of TAO, published in 1908, that lent his name to the condition. Since then, there have been changes in the epidemiology of the disease. From being understood as a peculiar affliction of Jews, it became a disease of the lower socio-economic societies. It was earlier reported as forming the larger part of peripheral vascular disease in India. Dr. Vira Reddy described a variant South Indian arteritis and outcomes of angiosome based revascularisation is reported. However, literature regarding the pattern of vessel involvement in Buerger's disease in Indian patients is lacking.

### Methods

We collected data retrospectively, from in-patient records, and identified all in-patient admissions for peripheral vascular disease. We further shortlisted patients with Buerger's disease. Shionoyas criteria was used to diagnose TAO. These were an age of onset less than 50, a history of significant tobacco use, absence of other risk factors for atherosclerosis, medium vessel involvement (infra-popliteal/brachial disease), upper limb involvement or superficial thrombophlebitis. Patients with positive lab tests for vasculitis, cardiac emboli or hyperhomocystenemia were excluded. The site of involvement was noted along with the intervention offered.

### Results

In our series, out of a total of 1273 patients admitted with various peripheral vascular diseases, we had 152 pa-

tients of Buerger's disease admitted over a 6 year period from Jan 2005 to Dec 2010. These constitute a section of patients who have intractable pain requiring interventions. We had a male preponderance (151/152) reflecting the prevalent smoking habits in our population. The mean age of our patients at presentation was 37.8 years and the mean age since the start of the disease was 36.0 years (16-50). Data on smoking was obtained from 53 patients and the mean smoking pack year was 15.39.

We looked at the pattern of vascular involvement and found that 5 (3.29%) patients had aorto-iliac disease, 6 (3.95%) patients had iliofemoral disease, 63 (41.4%) had femoro-popliteal disease and 78 (51.3%) had only tibial involvement. Eighty four (55.26%) patients presented with bilateral lower limb involvement. Twenty (28.4%) patients had upper limb involvement. Only 5 (3.29%) patients had recorded superficial thrombophlebitis.

The mean age at presentation of patients with aorto-iliac disease was 38.4 years and the mean age at onset was 37.6 years with a 17.5 pack year history of smoking. The only female patient in our study fell in this group of vascular involvement. More patients (4/5) in this group had surgical interventions. Three had arterial bypass surgeries with one of them having an amputation 4 months later. One had CT guided sympathectomy for pain relief.

Six patients had iliofemoral segment disease. The mean

age of presentation of this group was 36.4 years and the mean age at onset was 33 years with 17.3 pack year history of smoking. Five patients required surgical intervention – 4 bypasses; 3 of which ended in amputation and one primary amputation. The rest were managed with pain relief measures. Five had bilateral lower limb involvement and one had upper limb involvement. The one postoperative mortality in our study occurred in this group of patients.

Sixty three patients had femoro-popliteal involvement. Mean age was 37.7 and mean age at onset was 35.5 years. Mean smoking pack year was 13.7. Twenty seven had surgical interventions - 16 had bypasses ; 3 of which required amputations also. Eleven had primary amputations. Five had angioplasties; 1 of these had amputation.

Seventy eight patients presented with tibial involvement. The mean age at presentation was 37.8 and mean age at

onset was 36.5 years. Mean smoking pack year was 16.5. Sixteen had primary amputations. Thirty nine had bilateral disease. Sixty two had CT guided sympathectomy, 3 were admitted for prostaglandin injections.

Two patients refused any intervention and were discharged on oral medications only. The rest underwent revascularisation or, if they had non-reconstructible disease, interventions for pain relief (Table 1). Ninety two patients required a CT guided sympathectomy for pain relief, 4 had epidural analgesia while the rest were managed with adequate oral analgesia. Thirty five patients had amputations. Twenty two patients had arterial bypass surgery, 7 of whom had amputation also. We had one postoperative mortality in a patient with ilio-femoral involvement who underwent an arterial bypass. However, the limb could not be salvaged and it resulted in an amputation.

**Table 1. Pattern clinical presentation and of vessel involvement**

Pattern of vessel involvement	Total number	Mean age at onset	Mean age at presentation	Smoking (pack years)	Total number of patients undergoing interventions
Tibial	78	36.5	37.8	16.5	16
Femoro-popliteal	63	35.5	37.7	13.7	27
Ilio-femoral	6	33	36.4	17.3	5
Aorto-iliac	5	37.6	38.4	17.5	4

## Discussion

Thromboangiitis obliterans (TAO), also known as Buerger's disease or von Winiwarter-Buerger syndrome, is a chronic, nonatherosclerotic, segmental, inflammatory, obliterative, tobacco-associated vasculopathy primarily involving the infrapopliteal and infrabrachial medium-sized and small arteries of predominantly young male smokers. (1) TAO is a disease which is common in India with upto 40% of patients with peripheral arterial disease. Diagnosis is based on clinical criteria. This is significantly different from the west where this disease is much less common and as such has earned the status of an "orphan disease".(2) The etiology of TAO remains unknown. There has been considerable speculation as to the possible etiologic factors and mechanisms. Autoimmune mechanisms, genetic predisposition, hypercoagulable states, and an oral infection-inflammatory pathway have all been suggested as potential factors (6-8) A better understanding of the nature of the disease is required.(1)

At the turn of the last century, TAO was considered a disease that affects males exclusively. But in recent years there has been a change in demographics with more women starting to use tobacco. Olin et al demonstrated a 23% incidence in women while a nationwide survey in Japan, in 1993, showed an incidence of 9.3% in women (9,10). However, our disease load occurred, overwhelmingly, in male patients.

Earlier reports had indicated that TAO formed 45-63% of the bulk of the peripheral vascular disease burden in India (11-13). In our study, it formed only 11.9% of in-patient admissions for peripheral vascular diseases. The pattern of referrals to our institution is probably reflective of the global changes in disease prevalence. There are reports of decreasing trend of TAO in the general population, probably reflecting decreasing trends in smoking(14-18). Most

of our patients were admitted for pain management and surgical interventions. All patients have some form of involvement of the infrapopliteal vessels. In addition to this, some have proximal extension of disease or involvement of visceral arteries. This though known to occur has not been previously reported in any large series. Overlap with other etiologies eg aortoarteritis may be a possibility, further studies are required in this area.

## Conclusions

The clinical presentation of thromboangitis is not limited to distal disease in Indians. Patients with involvement of the more proximal segments may respond to revascularisation procedures.

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