## **Original Research Article**

DOI: http://dx.doi.org/10.18203/2349-2902.isj20202062

# Role of risk factors, clinical features and treatment modality in early detection and management of Buerger's disease: a study from tertiary care centre Pondicherry

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Received: 20 April 2020 **Revised:** 05 May 2020 Accepted: 06 May 2020

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#### **ABSTRACT**

Background: Thromboangiitis obliterans is a disease of unknown aetiology seen under 45 years of age with no form of treatment has been successful in offering the victims of this disease a cure nor even a long-term remission. Objective of the study was to study the role of different risk factors, clinical features and treatment modality in early detection and management of Buerger's disease.

Methods: This is an experimental study carried out in 50 cases of Buerger's disease after obtaining a well-informed written consent in department of General Surgery in Aarupadai Veedu Medical College and Hospital. Period of study was from October 2015 to October 2017. Data was analysed with SPSS 23.0 version.

Results: Majority were from 31-40 years age group i.e. 30 (60%). Left lower limb was involved in 52% subjects. 80% smoked more than 20 cigarettes per day. Signs of ischemia was present in all 50 patients. Gangrene of the limb was seen in 14 patients (28%). Out of 3 patients with recurrent pain, 2 (66.7%) were relieved. Ulcer healing occurred in 5 out of 6 patients i.e. 83.3% and intermittent claudication was relieved in 2 out of 7 patients i.e. 28.6%.

Conclusions: Males are commonly involved in our study. Majority of patients were in age group 31-40 years. Smoking is an important and definite risk factor in relation with the development of Buerger's disease. Lower limb is commonly involved. Majority of patients in our series were treated by conservative management.

**Keywords:** Buerger's disease, Clinical features, Risk factors, Treatment

## **INTRODUCTION**

obliterans (TAO) Thromboangiitis is atherosclerotic, segmental inflammatory disease that most commonly affects the small and medium-sized arteries and veins in the upper and lower extremities. 1-3

Although TAO is a type of vasculitis but it differs from other types of vasculitis in having highly inflammatory thrombus with relative sparing of the blood vessel wall; normal levels of acute phase reactants and absence of markers of immune activation.4

Buerger's disease is a disease of the small and mediumsized blood vessels but there have been occasional reports where it has involved large elastic arteries such as the aorta, the pulmonary artery, and iliac arteries also.<sup>5,6</sup> There are widely varying prevalence rates of Buerger's disease in Europe and Asia ranging from 0.5% to 5.6% in Western European countries, 3% in Poland, and 6.7% in

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East Germany to 45% to 63% in India, and 16% to 66% in Korea and Japan.<sup>7,8</sup>

TAO is a disease of unknown aetiology seen under 45 years of age with current or recent history of tobacco use and presence of distal-extremity ischemia indicated by features of claudication or pain at rest associated with ischemic ulcers or gangrenes. It is documented by non-invasive vascular testing; exclusion of autoimmune diseases, hypercoagulable states and diabetes mellitus; exclusion of a proximal source of emboli by echocardiography or arteriography of the clinically involved and non-involved limbs. But with the increase in smoking habits among females, studies show recent increase in female TAO patients varying between 11% and 23%.<sup>8,9</sup>

Despite many efforts and studies, the aetiology remains obscure. But one advantage of such a vast study done in this field to find out its cause is the emergence of a body of knowledge regarding various factors that contribute towards worsening or lessening the severity of the disease. No form of treatment has been successful in offering the victims of this disease a cure nor even a long-term remission. The number of procedures and surgical techniques testify to the fact that none is satisfactory. This concord will continue until the aetiology that has eluded all efforts hitherto is found out.<sup>9</sup>

Till such time what is required of us interested in these studies is to be optimistic and opportunistic towards our efforts in searching out the aetiology and learn the modern trends in the management of patients keeping always in view that management is meant primarily to mitigate the sufferings of the victims and afford them the maximum comfort under the present state of our knowledge of this disease.

So, the present study was carried out to assess the role of different risk factors, clinical features and treatment modality in early detection and management of Buerger's disease.

#### **METHODS**

This is an experimental study carried out in 50 cases of Buerger's disease after obtaining a well-informed written consent in department of General Surgery in Aarupadai Veedu Medical College and Hospital. Duration of study was 2 years from October 2015 to October 2017. Permission from Institutional Ethical Committee was obtained before the start of the study.

#### Inclusion criteria

Patients of age between 18-50 years, chronic smoker, rest pain, intermittent claudication, ischaemic ulcer or gangrene were included.

#### Exclusion criteria

Patients with more than 50 years, presence of atherosclerotic risk factor other than smoking like diabetes mellitus, hypertension, hyperlipidemia, auto immune diseases, hypercoagulable states, involvement of larger arteries – supra popliteal were excluded.

#### Method of data collection

The method of the study consisted of taking a good clinical history in a chronological order as soon as the patient was admitted. A thorough clinical examination was carried out personally to find out and establish clinically first, the presence of vascular obstruction. The degree of vascular inadequacy and extent of the spread of the disease was assessed clinically by noting the colour change, extent and spread of gangrene and absence of peripheral pulses in the affected limbs.

Depending on these, patients were subjected either for conservative management or revascularization procedure or amputation. The treatment of each patient was individualized with the aim to achieve foot salvage wherever feasible. Preoperative evaluation of patients for Revascularization was done. Operative steps and preoperative complications were noted in detail and tabulated. Postoperative complications with respect to postoperative pain, hospital stay and other complications were treated accordingly. Patients who returned for follow up were asked about detailed post-operative history and the progress of the disease was assessed.

#### Statistical analysis plan

The data thus collected was entered in excel sheet and analysed with SPSS 23.0 version. Qualitative data was expressed as percentages. Graphical presentation of data was done by using bar diagrams.

## **RESULTS**

Out of total 50 patients of Buerger's disease involved in our study, majority were from 31 to 40 years age group i.e. 30 (60%) followed by 13 i.e. 26% were from 41-50 years age group and remaining 7 i.e. 14% were from 21-30 years age group (Table 1). Also, we observed that males were commonly involved as in our study.

Left lower limb was involved in 52% subjects followed by right lower limb in 44% and 4% with bilateral lower limbs (Figure 1).

Table 1: Age wise distribution of study subjects.

Age group in years	Frequency	%
21-30	7	14
31-40	30	60
41-50	13	26

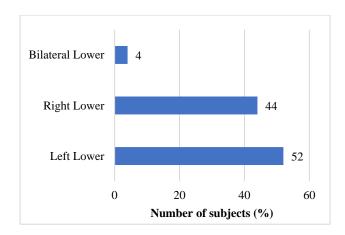


Figure 1: Distribution according to limb involvement.

Table 2: Distribution according to number of cigarettes smoked per day.

Number of cigarettes per day	Frequency	%
Non smokers	0	0
Occasional smoker (less than 10)	0	0
Moderate smoker (10-20)	10	20
Heavy smokers (>20)	40	80

In majority of the patients, i.e. 40 (80%) smoked more than 20 cigarettes per day and in 10 i.e. 20%, smoked 10 to 20 cigarettes per day. Smoking was strongly associated in our study (Table 2).

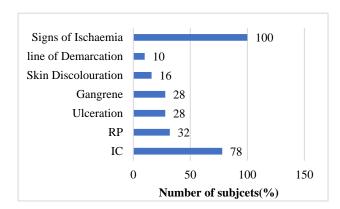


Figure 2: Distribution according to mode of presentation.

Blackish discoloration due to hyperpigmentation was seen in only 8 patients (16%). Gangrene of the limb was seen in 14 patients (28%). Signs of ischemia was present in all 50 patients either in form of thinning of skin, diminished growth of hair, loss of subcutaneous fat, shininess of skin, trophic changes in nail, minor ulceration. Ulceration was seen in 14 patients (28%). Out of total 14 patients with gangrene, 5 patients i.e. 10% had a definite line of demarcation and 9 patients (18%) did not have definite line of demarcation (Figure 2).

Table 3: Involvement of peripheral vessels.

Peripheral vessel involvement	Frequency	%
Dorsalis pedis alone	0	0.0
Posterior tibial alone	0	0.0
Dorsalis pedis and posterior tibial	45	90.0
Dorsalis pedis, posterior tibial and popliteal	5	10.0
Radial and ulnar	0	0.0

Peripheral arterial examination revealed that in majority of cases i.e. 45 (90%), dorsalis pedis and posterior tibial artery involved whereas in 5 i.e. 10%, combined dorsalis pedis, posterior tibial and popliteal artery was involved (Table 3).

Table 4: Outcome of lumbar sympathectomy.

Signs and	No. of	Relieved		Not relieved	
symptoms	cases	N	%	N	%
Recurrent pain	3	2	66.7	1	33.3
Ulcer	6	5	83.3	1	16.7
Intermittent claudication	7	2	28.6	5	71.4

Out of 3 patients with recurrent pain, 2 (66.7%) were relieved. Ulcer healing occurred in 5 out of 6 patients i.e. 83.3% and intermittent claudication was relieved in 2 out of 7 patients i.e. 28.6% (Table 4).

#### **DISCUSSION**

#### Age and gender

Our study shows majority were from 31 to 40 years age group i.e. 30 (60%) and males were commonly involved in our study. Telford et al had mentioned TAO in a case at 8 years of age. <sup>10</sup> Allen reported it in a 17-year-old male. They emphasized that between 40-50 years, atherosclerosis would be a more likely cause of the arterial disease and for the diagnosis of Buerger's disease after the age of 50 years a good evidence of histological proof would be required. So, Allen remarked that it was safe to make a diagnosis of TAO between 35 and 40 years.

Buerger had given age incidence of TAO between 20-30 years. His average being 32 years 5 months. Telford et al and Stopford's series of 48 cases showed age incidence of 45 years as average.<sup>10</sup>

Homan's series lies between 20-40 years and Wright's between 40-55 years.<sup>12</sup> In Mayo clinic series youngest was 17 years of age and oldest was 73 years.<sup>13</sup> So, it appears obvious that it is safe to make a diagnosis of TAO clinically in patients between 20-50 years of age,

and with a strong radiological and pathological evidence after the age of 45 years.

#### Smoking and Buerger's disease

80% of the subjects in our study smoked more than 20 cigarettes per day and smoking was strongly associated in our study. In 1904, Erb mentioned the possible relationship of smoking to the vascular disease and called it nicotine arteritis. In 1918, Mayer stated that the disease was due to tobacco smoke. In 1927 Silbert stated that whatever the underlying causes of arterial pathology, prolonged smoking was the immediate causative factor in the disease. Many workers agreed to the fact that great majority of the patients who had Buerger's disease had been heavy smokers and smoked more than 20 cigarettes per day on the average. Is

Occasionally non-smokers also develop this disease. Telford et al stated the case of an athlete who had never smoked till the onset of the disease. 10

The disease was quite severe and progressive in all those who refused to give up smoking. All types of treatment would be futile if tobacco smoking continued. But cessation of smoking brings about a notable remission in the history of the disease and runs a favourable course. Lewis stated of a case in whom after 10 years of remission the disease was precipitated by smoking a single cigarette. In a study Silbert, concluded that all their patients were males below the age of 55 years, predominantly belonging to low socioeconomic group and having history of bidi (tobacco) smoking. They also suggested that the venous and arterial involvement is progressive with the continuation of smoking. <sup>16</sup>

#### Peripheral pulsations

In 90% of cases in our study, dorsalis pedis and posterior tibial artery involved. According to Martin et al femoropopliteal involvement would be seen in 18.4% of cases. <sup>17</sup> According to Richards et al upper limb involvement occurred in 29% cases. <sup>18</sup>

Impairment or absence of pulsation of dorsalis pedis artery occurs in nearly 10% of normal persons as an anatomical anomaly. Hence under these conditions arterial insufficiency should not be pronounced merely on the basis of absent arterial pulsation without further evidence of ischemic manifestations like colour and temperature changes. But such anomalous absence or changes are very rare with posterior tibial artery and hence in absence of posterior tibial arterial pulsations the presence of occlusive arterial disease can easily be assumed.

## Lumbar sympathectomy

Pain relief was seen in 66.7%, ulcer healing in 83.3% and intermittent claudication relief in 28.6% in our study. The

initial results of lumbar sympathectomy (LS) in all these patients were markedly good. Patients following LS did show evidence of healing of ulcer. Patients were relieved of their RP had better sleep and showed post-sympathectomy rise in cutaneous temperature of denervated limbs. A prolonged follow up beyond their stay in the hospital was not possible in most of the patients because the patients did not turn up for regular check-up.

In our study, there was no contraindication to LS and the postoperative period was uneventful. Patients who complained of IC showed subjective evidence of improvement in 2 out of 7 cases (28.57%). Statistical data of the results of LS on IC alone do not show much improvement.

Gillespie et al had studied 100 cases and gave his analysis as follows.<sup>19</sup> Overall improvement was seen in 86% of cases. In cases of claudication only improvement was seen in only in 13% of cases.

Oldham concluded that sympathectomy had little or no influence on the blood supply of muscle during activity and therefore not indicated in patients in whom only symptom was uncomplicated IC.<sup>20</sup>

In my study, 2 patients out of 3 patients with RP at presentation showed improvement (66.67%). In my study 5 patients out of 6 patients with ulceration showed improvement in healing (83.33%).

The best results of lumbar sympathectomy were reported by Persson et al who performed sympathectomy on 22 limbs with adequate inflow but importantly with no evidence of neuropathy. Following are the results. 87% demonstrated complete ulcer healing whereas only 12% required amputation.<sup>21</sup>

Lee et al reported somewhat lower healing rates for patients with superficial toe gangrene with 56% of the involved digits salvaged by sympathectomy and a 40% toe salvages rate among those with 3 or more digits involved.<sup>22</sup>

Nesargikar et al showed in his study that sympathectomy has been shown to provide short-term pain relief and to promote ulcer healing in some patients with Buerger's disease, but no long-term benefit has been confirmed.<sup>23</sup>

### **CONCLUSION**

Males are commonly involved in our study. Majority of patients were in age group 31-40 years. Smoking is an important and definite risk factor in relation with the development of Buerger's disease. Lower limb is commonly involved. Pain in the limb with intermittent claudication was the predominant symptom in majority of patients. Majority of patients in our series were treated by conservative management.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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Cite this article as: Kiruba K, Koranga H, Ramaraj C, Takalkar AA. Role of risk factors, clinical features and treatment modality in early detection and management of Buerger's disease: a study from tertiary care centre Pondicherry. Int Surg J 2020;7:1718-22.