

A Clinical and Outcome Assessment of Peripheral Vascular Disease (PAD): an Observational Study

Ajay Kumar¹, Krishna Murari², Sandip Kumar³, Meenakshi Kumari⁴, Rashmi Prasad⁵

¹Associate Professor, Department of General Surgery, Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, India

²Associate Professor, Department of General Surgery, Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, India

³Associate Professor, Department of General Surgery, Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, India

⁴Consultant, Obstetrics and Gynecology, Khushi clinic, Ranchi, Jharkhand, India

⁵Sadar Hospital, Ranchi, Jharkhand, India

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Corresponding Author: Dr. Krishna Murari

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Abstract

Aim: The aim of the present study was to determine clinical and outcome profile of patients with peripheral vascular disease (PAD).

Methods: This observational study was conducted by random selection of 100 cases with Peripheral Arterial disease of the lower extremities admitted to surgical wards of RIMS, Ranchi, Jharkhand, India for the period of Jan 2022 to Feb 2023.

Results: Atherosclerosis was a more common presentation in this study. Among the 80 cases diagnosed with PAD due to Atherosclerosis in this study 70 were males and 10 patients were females. In this study all the 20 patients diagnosed with TAO were males. Majority of the cases in atherosclerosis were above the age of 50 yrs., while in the TAO group majority belong to the age group between 31 to 50 yrs. All patients had dry gangrene. Ischemic ulceration was present in 20 patients. Majority of the patients had popliteal disease in the atherosclerosis group, with TAO affecting more distal vessels and Atherosclerosis involving the more proximal arteries. Majority of the patients had an uneventful recovery, with complication rates being higher among the atherosclerosis group. In atherosclerosis group, 44 patients required secondary suturing of the surgical wound and two cases underwent revision amputation.

Conclusion: TAO and Atherosclerosis are the etiologies for ischemia in these cases, with atherosclerosis being more common of the two. TAO presented at a younger age group whereas atherosclerosis presented in the older age group.

Keywords: Peripheral vascular disease, Peripheral arterial disease (PAD), Acute Limb Ischemia (ALI)

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Introduction

Peripheral vascular disease or commonly known as Peripheral arterial disease (PAD) comprises those entities which result in obstruction to blood flow in the arteries, exclusive of the coronary and intracranial vessels and the term is usually applied to disease involving the arteries of lower extremity. [1] The symptoms of lower extremity arterial occlusive disease are classified into two large categories: Acute Limb Ischemia (ALI) and chronic limb ischemia. 90% of acute ischemia's are either thrombotic or embolic. Chronic ischemia is largely due to atherosclerotic changes that manifest from asymptomatic to limb-threatening gangrene. Peripheral arterial disease is an important manifestation of atherosclerosis involving the arteries of legs. [2]

Vascular surgeons continue to encounter complications of atherosclerosis as their most common clinical challenge. [3] Management of atherosclerosis plays an important role in adult medical care. Although only 1- 2% of people younger than 50 yrs. of age suffer from symptoms of intermittent claudication, this figure rises to 5% in those aged 50 to 70 yrs. and to 10% in those older than 70 yrs. [4] Vascular disease is a leading cause of morbidity and mortality in people with diabetes. Diabetic foot problems are due to combination of ischemia and neuropathy often complicated by infection. [5] Ischemia inhibits the ability of the wound to heal, further complicated by development of infection and gangrene. When associated with significant ischemia, diabetic foot ulcers require

arterial revascularization to achieve wound healing. [6]

Thrombo-angiitis obliterans (TAO) is an inflammatory occlusive disease primarily involving the medium sized muscular and smaller arteries in extremities, with smoking as the strong associated causative factor. In the lower limb, the disease commences in the digital arteries and small arteries of the foot and then proceeds to involve the crural arteries. [7] The clinical course of TAO is tremendously influenced by whether the patient stops smoking or not. If he continues to smoke there is progressive arterial insufficiency. [8] Peripheral artery disease (PAD) is a leading cause of morbidity. [9] This is a serious vascular condition characterized by debilitating atherosclerotic occlusion of lower limb arteries. [10] This is typically associated with multi-vessel disease, which raises the risk of morbidity and mortality and affects up to 14% of the general population. [11-12] In South Asia, there were 1,286,587 new cases of PAD, and 2964 deaths occurred due to it. Moreover, there were 68404 new cases of PAD among females and 43,876 new cases of PAD among males. [13]

The aim of the present study was to determine cardiovascular comorbidities associated with different stages of peripheral vascular disease and current use of pharmacological cardiovascular risk reducing therapy among men and women with the disease. [14]

Materials and Methods

This study was conducted by random selection of 100 cases with Peripheral Arterial disease of the lower extremities admitted to surgical wards of RIMS, Ranchi, Jharkhand, India for the period of Jan 2022 to Feb 2023.

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. Detailed vascular system examination was done as per the proforma provided.

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. This together with history of the patient regarding the distribution and type of pain,

gave in a fairly good number of cases studied, an idea of the state of patient's vascular condition. [14]

Later after clinical scrutiny, essential laboratory investigations were done as per the proforma provided to look for the presence of atherosclerotic risk factors. Patients were further evaluated objectively by Doppler scanning whenever feasible to assess the level and degree of obstruction objectively.

The treatment of each patient was individualized with the aim to achieve foot salvage wherever feasible. A record of patient's progress and response to various modalities of treatment was made. Patients who returned for follow up were followed up for minimum of six months and during each follow up detailed history was taken and progress of the disease was assessed.

In all cases, a structural Proforma was used to collect the information of an individual patient. Cases were collected as and when they presented with the following inclusion and exclusion criteria.

Inclusion criteria

- Patients presenting with signs and symptoms of Peripheral Arterial disease of the lower extremities like intermittent claudication, rest pain, ulceration and gangrene
- Patients with evidence of lower limb arterial occlusive disease on Doppler study

Exclusion criteria

- Patients with Peripheral Arterial disease of regions other than the lower extremities
- Patients with history of trauma to the lower extremities were excluded
- Patients presenting with pain of skeletal or neurologic origin of lower limbs with no evidence of vascular damage
- Patients presenting with ulcers of traumatic or infective origin with no evidence of ischemia
- Patient not willing to participate in the study
- Patient with immunocompromised state
- Patient with pregnancy

These cases were analyzed in detail with reference to age, sex incidence, and duration of clinical presentation, clinical manifestations and various investigations they underwent during the period of hospital stay.

Results

Table 1: Gender distribution

Gender	Atherosclerosis	Thrombo Angiitis Obliterans
Male	70	20
Female	10	0
Total	80	20

Atherosclerosis was a more common presentation in this study. Among the 80 cases diagnosed with PAD due to Atherosclerosis in this study 70 were males and 10 patients were females. In this study all the 20 patients diagnosed with TAO were males.

Table 2: Age distribution of patients

Age groups in years	Atherosclerosis	Thrombo Angiitis Obliterans
21-30	0	2
31-40	0	12
41-50	6	6
51-60	34	0
>60	40	0
Total	80	20

Majority of the cases in atherosclerosis were above the age of 50 yrs., while in the TAO group majority belong to the age group between 31 to 50 yrs.

Table 3: Extent of gangrenous changes and Doppler findings

Gangrenous changes	Atherosclerosis	Thrombo Angiitis Obliterans
Toes only	32	16
Toes and foot	44	4
Toes, foot and leg	4	0
Up to thigh	0	0
Total	80	20
Doppler findings		
Ankle	0	8
Infra-popliteal	28	12
Popliteal	44	0
Superficial femoral	8	0
Total	80	20

All patients had dry gangrene. Ischemic ulceration was present in 20 patients. Majority of the patients had popliteal disease in the atherosclerosis group, with TAO affecting more distal vessels and Atherosclerosis involving the more proximal arteries.

Table 4: Postoperative recovery

Postoperative events	Atherosclerosis	TAO
Uneventful recovery	38	12
Revision amputation	4	2
Secondary suturing	44	6
Death	0	0
Total	80	20

Majority of the patients had an uneventful recovery, with complication rates being higher among the atherosclerosis group. In atherosclerosis group, 44 patients required secondary suturing of the surgical wound and two cases underwent revision amputation.

Discussion

Peripheral vascular disease or commonly known as Peripheral arterial disease (PAD) comprises those entities which result in obstruction to blood flow in the arteries, exclusive of the coronary and intracranial vessels and the term is usually applied to disease involving the arteries of lower extremity. [15] The symptoms of lower extremity arterial occlusive disease are classified into two large categories: Acute Limb Ischemia (ALI) and chronic

limb ischemia. 90% of acute ischemia's are either thrombotic or embolic. Chronic ischemia is largely due to atherosclerotic changes that manifest from asymptomatic to limb-threatening gangrene. Peripheral arterial disease is an important manifestation of atherosclerosis involving the arteries of legs. [16] Vascular surgeons continue to encounter complications of atherosclerosis as their most common clinical challenge. [17]

Management of atherosclerosis plays an important role in adult medical care. Although only 1- 2% of people younger than 50 yrs. of age suffer from symptoms of intermittent claudication, this figure rises to 5% in those aged 50 to 70 yrs. and to 10% in those older than 70 yrs. [18] Atherosclerosis was a more common presentation in this study.

Atherosclerosis was a more common presentation in this study. Among the 80 cases diagnosed with PAD due to Atherosclerosis in this study 70 were males and 10 patients were females. In this study all the 20 patients diagnosed with TAO were males. Criqui MH et al. conducted a study and the prevalence of ischemic claudication in the population was found to be 2.2%, but on non-invasive testing, it was found that 11.7% of the population had large vessel PAD, 5.2% had both large and small disease. [19] Similar Prevalence was found in other studies. [20-23]

In a study done by Selvin E and Erlinger TP on the prevalence of and risk factors for peripheral arterial disease in the United States, it was found that although there was a slightly higher prevalence in men than in women, the prevalence dramatically increased with age, rising from 0.9% in those younger than 50 years to 14.5% in those 70 years or older. [24] Majority of the cases in atherosclerosis were above the age of 50 yrs., while in the TAO group majority belong to the age group between 31 to 50 yrs. All patients had dry gangrene. Ischemic ulceration was present in 20 patients. Majority of the patients had popliteal disease in the atherosclerosis group, with TAO affecting more distal vessels and Atherosclerosis involving the more proximal arteries. In a study, ilio-femoral site of block was commonest in atherosclerosis and infra-popliteal was commonest in TAO. [25] In the TAO group, the commonest site of arterial block was infrapopliteal vessels, seen in 100% of the cases. None had popliteal vessel disease and none extended to the femoral artery. Disease limited to the ankle vessels was seen in 29% of the TAO cases. A study from Japan determined the distribution of arterial involvement in TAO on the basis of a nationwide survey carried out in 1993. [26]

Majority of the patients had an uneventful recovery, with complication rates being higher among the atherosclerosis group. In atherosclerosis group, 44 patients required secondary suturing of the surgical wound and two cases underwent revision amputation. A recently published study states that the public is poorly informed about peripheral arterial disease, this leads to delay in presentation and diagnosis. Hence poor outcome of any intervention, the patient ultimately requiring amputation in some form. [27] Limb-loss is much more frequent once symptoms of rest pain or tissue loss become evident (critical limb ischaemia). In a prospective study from Italy, the risk of major amputation was 12.2% after only 3 months in patients with rest pain or ischaemic ulceration. [28] The risk of limb-loss is increased further when patients continue to smoke [29] and in patients with diabetes.

Conclusion

TAO and Atherosclerosis are the etiologies for ischemia in these cases, with atherosclerosis being more common of the two. TAO presented at a younger age group whereas atherosclerosis presented in the older age group. The most common presentation in these patients is gangrene of some part of the lower limb. Gangrene was limited to the distal limb in the TAO cases and extended to the proximal limb in atherosclerosis. Atherosclerosis is more frequently associated with Diabetes mellitus. Doppler findings correlated with the disease presentation, TAO having a more infra-popliteal obstruction and atherosclerosis showing more proximal obstruction.

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