PATTERN OF PERIPHERAL VASCULAR DISEASE IN TROOPS AND TROOP FAMILIES IN ARMED FORCES

Afshan Fayyaz, Ahsin Manzoor Bhatti*, Umar Fayyaz Ghani**

Army Medical College/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, *Combined Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan, **Combined Military Hospital Multan Pakistan

ABSTRACT

Objective: To delineate pattern of peripheral vascular disease (PAD) (upper or lower limb vessels) among troops and their families in the Armed Forces.

Study Design: Cross sectional descriptive study.

Place and Duration of Study: Armed Forces Institute of Cardiology (AFIC) and National Institute of Heart Diseases (NIHD) Rawalpindi and Combined Military Hospital (CMH) Rawalpindi over a 3 year period, from Aug 2012 to Aug 2015.

Material and Methods: All serving and retired army personnel and their families were included in the study. Method of sampling was non probability convenience sampling. The total number of patients was 156. All referrals were from CMH vascular surgery department. All arteriograms were performed on Siemens angiography equipment without facility of DSA (digital subtraction angiography). The lesions were placed in one of the following categories: normal category in whom either the vessels were normal or minimally diseased without any flow limitation, short and long segment stenoses, and short and long segment occlusions and diffusely diseased vessels. The arteriogram of infra inguinal region was divided into femoropopliteal segment and infra popliteal segment. SPSS version 14 was used to calculate the frequency and percentage of various disease patterns.

Results: The pattern of peripheral vascular disease was divided in the lower limb in infra inguinal region into femoropopliteal disease and infra popliteal disease. The predominant pattern of disease in the femoro popliteal segment was long segment occlusion and the disease pattern in the infra popliteal segment was diffuse disease of the involved vessels. The predominant pattern of disease in upper limb was long segment blockage.

Conclusion: Peripheral vascular disease among soldiers and families show advanced disease pattern at presentation.

Keywords: Femoropopliteal disease, Infrainguinal disease, Infrapopliteal disease, Peripheral vascular disease.

INTRODUCTION

Peripheral vascular disease has a prevalence of 10-15% in the general population. The incidence increases with advancing age and >10% of those over the age of 60-70 years are affected by the disease[1]. The disease affects 8-12 million Americans[2]. The prevalence has been found to be lower among South Asians[3]. However, studies from Pakistan indicate a very high prevalence of peripheral vascular disease of 31.5-44.7% among diabetics[4-6].

Peripheral arterial disease is a very important entity and has an association with coronary artery disease. Patients with peripheral arterial disease have a 3-6 times more risk of having a cardiac event in the form of heart attack than are patients without peripheral vascular disease[7].

The pattern of peripheral vascular disease is classified internationally according to TASC (trans atlantic intersociety consensus) and now revised TASC-II classification (table-I & II). In these classifications, the lesions are grouped according to whether they can be managed through endovascular approach or by surgery. No studies are available for frequency of various disease patterns of vascular disease in infra inguinal region. The purpose of the study was to

delineate the pattern of peripheral vascular disease among a selected population of troops and families in the Armed Forces.

MATERIAL AND METHODS

This cross sectional descriptive study was carried out in the Radiology Department of Combined Military Hospital (CMH) Rawalpindi and Armed Forces Institute of Cardiology (AFIC) Rawalpindi over three years period from Aug 2012 to Aug 2015. Limb vessels (only arteries) were studied. In the lower limb, the infra inguinal region was studied for the pattern of disease. In the upper limb, the vessels included in the study were the subclavian, axillary, brachial, radial and ulnar arteries. The number of patients included in

cm. Vessels with multiple areas of stenoses and occlusions were categorized as diffusely diseased vessels.

Lower extremity disease was defined as infrainguinal segment disease which was further divided into femoro popliteal and infra popliteal disease. Patients having involvement of both the femoro-popliteal and infra popliteal segment were categorized as having combined disease pattern. Upper extremity disease was defined as disease confined to upper limb vessels with the same criteria of stenoses and occlusions as for lower limb vessels.

All arteriograms were performed in angiography suite at AFIC with no digital

Table-I: Trans-atlantic intersociety consensus.

TASC-II: Classification of femoral and popliteal lesions
Type-A lesions
Single stenosis ≤10 cm in length
Single occlusion ≤5 cm in length
Type-B lesions
Multiple lesions (stenoses or occlusions), each ≤5 cm
Single stenosis or occlusion ≤15 cm not involving the infrageniculate popliteal artery
Single or multiple lesions in the absence of continuous tibial vessels to improve inflow for a distal bypass
heavily calcified occlusion ≤5cm in length
Single popliteal stenosis
Type-C lesions
Multiple stenoses or occlusions totalling >15 cm with or without heavy calcification
Recurrent stenoses or occlusions that need treatment after two endovascular interventions
Type-D lesions
chronic total occlusion of the common or superficial femoral artery (>20 cm, involving the popliteal artery)
Chronic total occlusion of the popliteal artery and proximal trifurcation vessels 4

the study were 156. Method of sampling was non probability convenience sampling.

Normal arteriogram was defined as disease free vessels/ vessels with minimal disease requiring no intervention and not falling into the criteria of stenosis. Minimal narrowing not causing blood flow obstruction was also defined as normal.

Short segment stenosis/ occlusion was defined as stenosis/occlusion <3cm along the length of the vessel. Long segment stenosis/ occlusion was defined as stenosis/ occlusion >3

subtraction angiography (DSA) facility. In all patients, 36-45 ml of non ionic contrast medium (omnipaque) was used in each limb. In all patients, antero posterior view of the limb was taken from the proximal to the distal part. In the lower limb, the foot of the patient was internally rotated to separate the tibia and fibula to avoid overlapping bone shadows. Frame rate was kept at 30/s and contrast was followed from the proximal to the distal part of the limb by moving the table top during image acquisition. Long acquision time of 30-60 seconds was used. Data was analysed on SPSS version 14. Mean and

standard deviation were calculated for quantitative variables. Categorical variables were presented by frequency and percentages.

RESULTS

A total of 220 limbs were studied in 156 patients during this period. Right leg arteriogram was done in 101 patients while left leg arteriogram was done in 110 patients. Upper limb arteriogram (right or left upper limb) was done in 9 patients. Age range of patients was 22-95 years with mean age of 58.78 ± 15.268. Male: Female ratio was 9.4:1.

Out of these 211 lower limb arteriograms, isolated femoro popliteal disease was seen in 55 limbs (26.06%), infra popliteal disease in 55 limbs (26.06%), combined femoro popliteal and infra popliteal disease in 68 limbs (32.22%). Normal arteriogram was seen in 25 limbs

occlusion was seen in 3 (2.43), long segment occlusion in 26 (21.13%), single vessel run off in 38 (30.89), while foot vessel disease was seen in 11 limbs (8.9%).

Upper limb arteriogram in 9 patients showed left upper limb involvement in 7 (77.7%) patients and right upper limb involvement in 2 (22.2%) patients. Long segment blockage of upper limb vessels was seen in 5 (55.5%) patients. Short segment stenosis of upper limb vessels was seen in 2 (22.2%) patients, aneurysm of an upper limb artery in 1 (11.1%) patient and a normal arteriogram in 1 (11.1%) patient.

DISCUSSION

Peripheral vascular disease is disease of the vessels outside of the heart and brain and is a significant cause of morbidity and mortality. In 2010 about 202 million people had peripheral

Table-II: TASC classification of infra popliteal lesions.

TASC-A

Single focal stenosis < 5cm in length in the target tibial artery with occlusion or stenosis of similar or worse severity in the other tibial arteries.

TASC-B

Multiple stenoses, each < 5cm in length, or total length < 10 cm or single occlusion < 3cm in length in the target tibial artery with occlusion or stenosis of similar or worse severity in the other tibial arteries.

TASC-C

Multiple stenoses in the target tibial artery and / or single occlusion with total lesion length > 10cm with occlusion or stenosis of similar or worse severity in the other tibial arteries.

TASC-D

Multiple stenoses involving the target tibial artery with total lesion length > 10 cm or dense lesion calcification or non visualization of collaterals. The other tibial arteries occluded or dense calcifications.

(11.8%). Inadequate study with blocked common iliac/external iliac artery were seen in 8 limbs (3.79%).

Out of 123 limbs with femoro popliteal disease, short segment stenosis was seen in 17 (13.82), long segment stenosis in 8 (6.50%, short segment occlusion in 2 (1.6%), long segment occlusion in 78 (63.41%), and diffuse disease in 13 limbs (10.56%). Thrombus in femoro popliteal segment was seen in 5 patients (4.06%).

Infra popliteal disease was seen in 123 limbs. Out of these short segment stenosis was seen in 4 limbs (3.25%), diffusely diseased infra popliteal segment was seen in 41 (33.3%), short segment

artery disease (PAD) worldwide. In the developed world it affects about 5.3% of 45 to 50 years old and 18.6% of 85 to 90 year old. In the developing world it affects 4.6% of people between the ages of 45 to 50 and 15% of people between the ages of 85 to 90 years. In the developed world PAD is equally common among men and women[8]. According to our study in the population studied, male: female ratio was 9.4:1. This may be related to under reporting of females to hospitals as well as the low prevalence of smoking in females in our society. However, further studies are required for gender prevalence of peripheral vascular disease in this region.

Peripheral vascular disease is a significant cause of mortality and according to study by Naghavi, in 2013 PAD resulted in about 41,000 deaths up from 16,000 deaths in 1990[9].

The true incidence of peripheral vascular disease is not known in Pakistan. The pattern of peripheral vascular disease in different body regions has been described according to trans-atlantic intersociety consensus (TASC) and TASC II classifications (table-I, II). These classifications delineate the pattern of disease and place them in categories according to the treatment modalities used to treat these lesions with TASC A and B going for endovascular treatment and TASC C and D for surgical intervention. TASC classification delineates disease pattern in both femoropopliteal and infra popliteal segments where as TASC II, the revised version only describes disease pattern in femoro popoliteal segment and not the infrapopliteal segment. The various disease pattern affecting these region has not been studied in great detail in studies to date.

According to our study, femoro popliteal and infra popliteal segments were affected in about equal proportions. According to some studies, a higher frequency of involvement of femoro popliteal compared with the infra popliteal segment is seen[10,11]. Moreover, Combined disease affecting both femoro popliteal and infra popliteal segments was seen in the majority of patients in our study. Peripheral long segment arterial occlusion was seen as the predominant pattern of femoro popliteal disease. Occlusive disease in femoro popliteal region is the predominant disease identified in this region and it is typically more diffuse than identified in other segments[12]. This is due to the mechanical stresses in this region superimposed with atherosclerotic changes. Short segment arterial stenoses and occlusions were seen in a small number of patients in our study.

Diffusely diseased vessels was the predo-minant disease pattern in the infra popliteal segment. According to Bernstein, multilevel disease pattern is the predominant pattern in the infra popliteal segment[13]. This is likely due to the small calibre of the vessels in the infra popliteal region and preferential involvement of distal lower limb vessels by some disease processes.

CONCLUSION

Peripheral vascular disease among soldiers and families show advanced disease pattern at presentation.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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