A Pilot Study On Effect Of Squatting On Lower Limb Peripheral Vascular Disease

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Citation

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Abstract

Context: Lower limb arterial disorders are common causes of morbidity. It is affected by various factors like age, hypertension and diabetes. It is common in lower socioeconomic strata. This pilot study is done to know the effect of squatting position, which is commonly found during agricultural and various other occupations. Aim : To study the effect of Squatting in patients with established Arterial Disorders of Lower limbs compared to normal persons. Methods and Material: Patients with lower limb arterial disorders(cases) and normal persons(controls),10 each were made to squat and asked about symptoms, numbness and pain. Peripheral pulses were examined in both standing and squatting position. Results were confirmed by Doppler USG. Results: Controls complained of numbness after an average of 20 minutes. Blood flow was absent during squatting. Cases complained of numbness after an average of 2 minutes and developed pain in the involved limb after an average of 6 minutes. They were not able to squat after 15 minutes. Conclusions: Squatting worsens the disease in patients with lower limb arterial disorders hence should be avoided even if it is for small duration.

INTRODUCTION

Arterial disorders are one of the common causes of mortality and morbidity in developing as well as developed countries. The prevalence of peripheral vascular diseases is about 7 to 9%¹. Prevalence increases to 12% to 16% after the age of 65 years. It includes variety of disorders which usually end in atherosclerotic phenomenon of vessels¹. It is influenced by various factors which includes smoking, age, hyperlipidemia, hypertension, diabetes mellitus etc....¹. In India, its prevalence is increasing due to increased life expectancy, increased tobacco smoking and increased prevalence of diabetes. In India, prevalence is same with people of both high and low socio-economic strata.

Does squatting temporarily worsen lower limb ischemia? Main occupation of rural India is agricultural works which demands continuous squatting posture. Some other occupations which require squatting are carpentry, housemaid work and fabrication and construction works etc... More than that, only about 5% of Indians may have access to western commode². All these result in people assuming squatting position for some duration everyday. Does this have any effect in patients of lower limb arterial disorders?

This study is a pilot study to assess the effect of squatting on

general and at risk population.

OBJECTIVE

To study the effect of Squatting in patients with established Arterial Disorders of Lower limbs and comparing with normal persons.

MATERIALS AND METHOD

The study was conducted over 01month comparing effect of squatting on patients with established peripheral vascular disease and those without peripheral vascular disease.

CASES

Patients with history Suggestive of arterial disorders (intermittent claudication⁴, Blackish discolouration of toes, Ulcers over toes/foot) were examined in detail and Doppler USG examination was done. Those patients with arterial disorder confirmed by Doppler were selected as cases (sample size 10).

CONTROLS

Healthy persons with no symptoms of arterial disorders and normal Doppler USG study were selected as controls (sample size 10).

METHOD

Controls and cases were made to squat (Photos 1). They were asked about symptoms of numbness and pain in both limbs. Posterior tibial and dorsalis pedis pulsations were examined in standing and squatting postures. Duplex USG scan examination was also carried out in both standing and squatting postures. Results were tabulated and analysed.

Figure 1

Photo 1: Squatting position



OBSERVATIONS

The age of control population varied from 28 to 50 yrs with average of 37yrs. Age distribution of cases varied from 35 to 58 yrs with average of 43 yrs. All study population was male.

Among 10 patients with peripheral vascular disease, 06 of them had diffuse atherosclerosis but peripheral pulses were feeble. 4 of them had diffuse atherosclerosis with no palpable peripheral pulsations. Out of 10 patients, 3 of them had bilateral involvement.

The effect of squatting on each group was as follows.

CONTROLS

Controls complained of numbness of both limbs after a period of 15-25 mins (average of 20mins). None of them complained of pain. Both the mentioned pulsations disappeared for the whole duration of squatting both clinically and in Duplex USG (photos 2,3). On returning to normal position, pulsations returned back promptly and immediately. Numbness remained for 3 to 4 minutes.

Figure 2

Photo 2: Absent posterior tibial blood flow on squatting



Figure 3

Photo 3: Absent blood flow in posterior tibial with loss of waveform.



CASES

Patients complained of numbness in affected limb in 1-5 min (avg 2 mins) and developed pain in the involved limb in 4 to 10 min (avg 6 mins). They developed numbness in the opposite limb also in 10 to 15 min duration. Patients were unable to squat after 15 min because of severe pain.

In patients who had no palpable pulsations with feeble blood

flow in duplex scan, blood flow was absent throughout the duration of squatting. Patients with feeble pulsations in normal position, blood flow disappeared completely in squatting in duplex USG. On returning to normal position, blood flow appeared after 10-30 seconds in duplex scan and after 2-4 mins pulses became palpable clinically.

DISCUSSION

Squatting results in kinking of major arteries of lower limb. Common femoral artery is kinked at the hip and popliteal artery is kinked at the knee .There is resultant reduction or possibly complete cessation of blood flow to lower limb through these major vessels, although temporarily. This causes ischemia of the limbs for the same duration causing numbness of limbs. In normal people, circulation is maintained by collateral circulations present around hip and knee. Once the person comes back to normal position, the circulation is re-established and there is no residual damage. In patients with established peripheral vascular disease, squatting leads to complete cessation of already compromised blood supply in major vessels. The collaterals which are already functioning maximally cannot cope up with decreased blood supply and some amount of ischemic injury of the tissues will occur. Once the patient comes back to normal position, there is some amount of ischemiareperfusion injury. This reperfusion injury as well known,

mediated by super oxides and myoglobin³. This leads to further insult to the already damaged tissues. Thus there is acceleration of the disease with every episode of squatting.

The findings in our pilot study definitely points out the negative effect of squatting on lower limb arterial disorders. This observation will encourage us and other specialists in the subject to conduct much needed large scale studies to delineate the effects of squatting on arterial disorders of lower limb.

CONCLUSION

People with established peripheral vascular disease should avoid going in to squatting position even if it is for very short duration. It is desirable for such persons to use appropriate supports like chairs which will allow them to work without squatting or a change in occupation.

References

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