EFFECT OF HEIGHT ON CHRONIC VENOUS INSUFFICIENCY PATIENTS OF RURAL WARDHA: A CROSS SECTIONAL STUDY

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INTRODUCTION

Incompetence of the deep, superficial and/or perforating veins lead to increasing venous pressure. Long term increase in venous pressure damages venous valve. Due to damage in venous valve vein appears as dilated, elongated, tortuous, pitted, thickened, inelastic and friable veins. Venous disorders manifest mostly as varicose veins. It can result in hyperpigmentation, edema and indurations with eventual ulceration. These changes in the skin and subcutaneous tissues of the lower leg are often referred to clinically as chronic venous insufficiency (CVI) Garg K (2009).


Adult height is a combined product of genetic and environmental factors. The data from National Family Health...
Survey (NFHS) conducted in India in 2005–2006 found mean adult height for men to be 164.74 cm (95% CI 164.67, 164.81) and 151.92 cm (95% CI 151.88, 151.97) for women. (Perkins JM et al., 2011)

Some studies (A. M. Stewart et al 1955, Laurikka et al. 2002, Lee A J, 2003) had found height to be risk factor for chronic venous insufficiency. Till date no study has been conducted to know the variation in saphenous venous diameter due to patient’s height in chronic venous insufficiency patients of rural Wardha. Paucity of data concerning the impact of height on chronic venous insufficiency in rural Wardha provides strong rationale for conducting this study. In this study we want to find the variation in saphenous venous diameter due to height in chronic venous insufficiency patients of rural Wardha.

MATERIAL AND METHODS

The design of the study was cross sectional type of observational study involving a single group of patients with chronic venous insufficiency with incompetent sapheno-femoral junction. The study was conducted at the Department of Tifac- Core of Interventional Radiology in collaboration with Department of Physiology, Jawaharlal Nehru Medical College, Sawangi (Meghe), Wardha, Datta Meghe Institute of Medical Sciences University (Deemed University), Nagpur, Maharashtra.

Clearance from Institutional review board was obtained. Study duration was 2 years. The patient of Chronic venous insufficiency attending outdoor patient department or admitted in wards of Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe), Wardha were subjected to interview, clinical examination, and investigations using the structured schedule. The study group includes 57 patients consisting of 10 females and 47 males with mean age of 43.9 ± 12.2 yrs. Informed consent was taken from the patient.

Inclusion criteria were varicose veins of grade C3-C6 and Chronic venous insufficiency with Incompetent sapheno-femoral junction. Exclusion criteria were Occlusive arterial diseases of leg, Obliterative arteriosclerosis, Atherosclerosis of leg veins, chronic venous insufficiency with competent sapheno-femoral junction; varicose veins grade C1, C2 were diagnosed by clinical examination of veins and was confirmed by colour Doppler examination.

In 2 year duration total of 57 Patient fulfilled the criteria of varicose veins of grade C3 to C6, who were clinically positive with Trendelenburg test and Perthes test and who were positive on duplex scanning examination for chronic venous insufficiency with incompetent sapheno-femoral junction and they agreed to participate in the study by giving written consent.

The diameter of the great saphenous vein was measured by B scanning on Philips Enviser USG and colour Doppler unit. High frequency linear array transducer probe of 7.5 megahertz was used. The probe was placed at an angle of 45° along the great saphenous vein at the junction of upper 2/3 of thigh and lower 1/3 of thigh, and also at sapheno femoral junction.

Occlusive arterial diseases of leg and Obliterative arteriosclerosis were diagnosed by clinical examination of posterior tibial artery, dorsalis pedis artery, popliteal artery and femoral artery. In suspected cases diagnosis was confirmed by colour Doppler examination. Atherosclerosis of leg veins, chronic venous insufficiency with competent sapheno-femoral junction, varicose veins grade C1, C2 were diagnosed by clinical examination of veins and was confirmed by colour Doppler examination.

Diagnosis of great saphenous vein incompetency was done by Doppler ultrasonographic examination in β (Brightness) - mode. Patient was asked to lie comfortably in supine position on the examination couch. The Doppler sample volume was placed at an angle of 45° along the great saphenous vein at the junction of upper 2/3 of thigh and lower 1/3 of thigh, and also at sapheno femoral junction.

In patient with Reverse flow longer than 0.5 seconds in saphenous segment of great saphenous vein was diagnosed to have superficial venous incompetence (Labropoulos N et al., 2003). And reverse flow longer than 0.5 seconds at sapheno femoral junction was diagnosed as incompetent sapheno-femoral junction.

RESULT

The mean height of total 57 patients with chronic venous insufficiency was 1.68 ± 0.09 meters. Table no. 1 shows distribution of patients according to their height (m).

<table>
<thead>
<tr>
<th>Height(meters)</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.40-1.49</td>
<td>3</td>
<td>5.2631</td>
</tr>
<tr>
<td>1.50-1.59</td>
<td>7</td>
<td>12.2807</td>
</tr>
<tr>
<td>1.60-1.69</td>
<td>21</td>
<td>36.8421</td>
</tr>
<tr>
<td>1.70-1.79</td>
<td>22</td>
<td>38.5964</td>
</tr>
<tr>
<td>1.80-1.89</td>
<td>4</td>
<td>7.0175</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Mean ± SD = 1.68 ± 0.09

Table 1 Distribution of patients according to their height (m)
Table no. 2 and graph no. 1 shows positive correlation of height (mean = 1.68 m) on X axis and saphenous venous pressure in supine (mean = 11 mm Hg) on y axis, indicating that increase in height is associated with increase in great saphenous venous pressure. \((r=0.355, p<0.05)\). The significant correlation was further interpreted by linear regression analysis. 12.9% variation observed in pressure in supine is due to the increased height \((R^2=0.129)\). After making the variable unit less, standardized coefficient was found to be “Height = 0.355 PS”. \((t=2.815, P<0.01)\)

Table 2 Correlation of Height (m) with GSV pressure in supine (mmHg) Pearson’s Correlation Coefficient

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
<th>Correlation 'r'</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HT</td>
<td>1.68</td>
<td>0.09</td>
<td>57</td>
<td>0.355</td>
<td>0.007</td>
</tr>
<tr>
<td>GSV Pressure in Supine</td>
<td>11</td>
<td>2.4</td>
<td>57</td>
<td>0.355</td>
<td>0.007</td>
</tr>
</tbody>
</table>

Table 3 Correlation of height (m) with GSV pressure on Valsalva maneuver (mmHg) Pearson’s Correlation Coefficient

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
<th>Correlation 'r'</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HT</td>
<td>1.68</td>
<td>0.09</td>
<td>57</td>
<td>0.344</td>
<td>0.0089</td>
</tr>
<tr>
<td>GSV Pressure during Valsalva maneuver</td>
<td>23</td>
<td>3.6</td>
<td>57</td>
<td>0.344</td>
<td>0.0089</td>
</tr>
</tbody>
</table>

DISCUSSION

Our study had found a positive correlation of height and saphenous venous pressure in supine as well as during Valsalva maneuver. Height may cause 12.9% increase in venous diameter in supine position and 11.9% increase in diameter on Valsalva maneuver. Our findings are in accordance with (A. M. Stewart et al. 1955).

Relation between increase in height and varicose veins may be explained on the basis that, as the height increases, the hydrostatic column of the blood also increases in patients with chronic venous insufficiency. Hydrostatic and gravitational pressures are expressed as a constant multiplier of 0.77 mmHg for every cm rise in vertical distance below the atrium. The pressure is highest in the upright (sitting or standing) but motionless individual. (Meissner M. et al., 2007). More the hydrostatic pressure more is the risk for development of venous hypertension and so the varicose veins.

Increase in height is associated with a slight increased risk of reflux in men (Fowkes F G Ret al. 2001), which may increases the risk of chronic venous insufficiency.

Increasing height showed a significant relationship with trunk varices in the Edinburgh Vein Study both in males and females (Lee et al. 2003). In the Tampere Varicose Vein Study it was also an independent determinant for varicose veins in both sexes (Laurikka et al. 2002).

While no constant relationship was found between venous pressure and height by (Krinsky C M et al 1936). Another Finnish study (Sisto et al. 1995) and a French study (Carpentier et al. 2004) found height significant only in women.

No association was reported in the studies from Turkey (Komsuoglu et al. 1994), Switzerland (Guberan et al. 1973) and Japan (Hirai et al. 1990).

CONCLUSION

Height has been associated with the presence of varicose veins in patients of rural Wardha. The study has indicated that damage to the venous drainage caused due to increased height is severe and it cause 12.9% increase in venous diameter in supine position and 11.9% increase in diameter on Valsalva maneuver. More precaution should be taken in taller subject for prevention of chronic venous insufficiency.

LIMITATION

Study should be conducted on larger population and in different regions of the world.
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References


