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Obesity and reduced joint mobility in people with chronic venous disease

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Abstract

Objective: The aim of this study was to find out a possible relationship between obesity and decreased mobility of the talocrural joint.

Subjects and methods: It was a cross sectional study. 120 obese patients were recruited on the basis of inclusion criteria.

Inclusion criteria were obesity with a BMI above 30 kg and the exclusion criteria were any kind of infectious disease. An informed consent was given to the patients after explaining the purpose of the study. All the data would be confidential at any stage. Patients were graded according to the clinical, etiological, anatomical and pathophysiological classification. Talocrural goniometry was executed to evaluate the degree of mobility of the legs. The Kolmogorov– Smirnov normality test, Kruskal–Wallis test, Dunn's Multiple comparison test and analysis of variance were used for statistical analysis tests with an alpha error of 5% being considered acceptable.

Results: The increase in body mass index is linked to the reduction in joint mobility (Kruskal–Wallis test: p-value

Introduction

Literature has reported that obese individuals are more prone to have venous disease and the venous reflux in obese limbs which is even worse.

Whereas still there is better functioning of muscle pump which also includes the residual volumes and fractions, ambulatory venous pressure, venous filling index and the ejection volume. The venous pressure of foot was remarkably higher in obese people as compared to healthier.

Many studies have showed that in the beginning of many diseases such as unilateral varicosities, chronic venous disease (CVD) developed in the contralateral the limb remains asymptomatic during first five years [1]. During the progression of CVD there is expansion of reflux and clinical deterioration of the affected extremity. The independent risk factors of CVD progression are Obesity, orthostatism, and noncompliance with compression therapy [2]. There is positive relation among obesity, CVD and popliteal venous compression.

Popliteal vein compression syndrome may clarify the previously unexplained venous presentations.

Surgical decompression has given better prognosis among those who were unresponsive to the conservative treatment [3]. In obese patients the risk of developing bilateral clinical manifestations of CVD is twice as compared to non-obese patients and the rate of disease increases with higher BMI.

In non-obese resting and exercise femoral vein pressures were similar. In a study Raju et al has reported that increased abdominal pressure has linked with obesity which is the major cause of obstruction in 11% of limbs [4].

Additionally, increasing the clinical, etiological, anatomical and pathophysiological (CEAP) classification is correlated with an increased mean BMI [5].

The association of BMI with clinical severity independent of reflux measurements indicates that the effect of overweight may involve a mechanism separate from local effects on venous flow.

Patients with CVD used to have another risk factor of skin changes that appears to be severe in obese people [6].

The aim of this study was to inquire a viable relationship between obesity and decreased mobility.

Method

It was a cross sectional study. 120 obese patients were recruited on the basis of inclusion criteria.

Inclusion criteria were obesity with a BMI above 30 kg and the exclusion criteria were any kind of infectious disease. An informed consent was given to the patients after explaining the purpose of the study. All the data would be confidential at any stage.

Patients were categorized according to the Comprehensive Classification System for Chronic Venous Disorders (CEAP) classification: C0 (venous insufficiency – no varicose veins), C1 (telangiectasias – small varicose veins), C2 (varicose veins and edema), C4 (trophic changes), C5 (healed ulcer) and C6 (open sore). To evaluate the degree of mobility of the legs (range of ankle motion), Talocrural goniometry was executed. The Kolmogorov– Smirnov normality test, Kruskal–Wallis test, Dunn's Multiple comparison test and analysis of variance were used for statistical analysis with an alpha error of 5% being considered acceptable.

The study was approved by the Research Ethics Committee of the institution.

Results

The study included 120 patients in which 12 did not match up with the inclusion criteria and were excluded remaining 8 refused to be a part of the study.

Rest 100 participants were included in the study of which 86% were females and 14% were males. The ages ranged from 18 to 68 years

The ranged between 18-72 years. The average of the age was 42 and the standard deviation of 12.4 years. The distribution of ages was approximately normal according to the Kolmogorov– Smirnov normality test (p-value ¼ 0.4163). 66% of the participants were falling in the grade III obesity or morbid obesity category which contains BMI greater than 40. Whereas 28% were in grade II obesity in which BMI was between 35.0-39.9 and only 6% were in grade I obesity, BMI ranges between 30.0-34.9

The mean BMI was 44.6 kg with a standard deviation of 5.4 kg (range: 33.1 kg/m2 to 57.1 kg/m2). The Kolmogorov–Smirnov normality test proves that the distribution of BMI has a normal pattern

The most common CEAP classification (30%) for the right leg of participants was C1, i.e. the patients had telangiectasias (small varicose veins), while for the left leg the most common was CEAP C2 (36%), that is, patients with varicose veins.

According to the Kolmogorov– Smirnov normality test the distribution of the ROAM of the right and left legs is approximately normal (p-values ¼ 0.3763 and 0.1342, respectively). Higher BMI is associated with decreased joint movement of both legs.

The analysis manifests that there is a remarkable difference in p-value classification and an increase in the CEAP classification with increased BMI and age. Therefore it has concluded that there is decreased function of suction-impulse pumps in obese people which aggravates with increasing age and worsening of CEAP. The increased abdominal pressure in obese patients may compromise the effectiveness of aspiration-impulsion pump. This theory is still under debate further literature is needed.

The worsening of joint mobility may influence the contractile mechanisms of the suction-impulse pumps, but the study found no impairment in pump function [7] [8]. It has linked with the degree of impairment of joint mobility. A study has reported that hemodynamics changes can occur and seen by plethysmography and joint mobility in the later stages of CEAP such as C5 and C6 classifications of CEAP

In this study, no patients were in these stages, stages in which the talocrural joint mobility could be further undermined. Among the pathophysiological mechanisms proposed is external compression of both intra-abdominal and popliteal veins [9] [10].

Only one study indicates that there is remarkable difference of venous flow parameters in the obese and non-obese individuals [11]. These findings suggest that mechanical role of abdominal adipose tissue potentially possibly are more prone to develop risk for both venous thromboembolism and chronic venous insufficiency [12]. The intra-abdominal resistance may hinder the efficacy of functionally well pumping. Patients who used to have standing for longer periods and do not use protective device such as compression garments are prone to have exacerbating of risk factors [13]

Associations between obesity and erysipelas have been described; this also contributes to aggravating lymphatic system diseases and may worsen fibrosis and the lack of joint mobility. Studies describe that there are many elements associated to this complex condition of CVD, for example, microvascular dysfunction, calf muscle pump efficiency, dermal inflammation; disordered fibroblast function and matrix production; failure of epithelialization, congenital and acquired thrombophilia, malnutrition, obesity and diet; and bacterial colonization [14]

Total 105 women were admitted for bariatric surgery out of 29 had previous history or migraine.

These patients were not different from non-migraine patients in terms of their demographics and obesity-related health characteristics. The frequency of migraine before the surgery was average 6.0 per month and it was 1.0 per month after the 6-month follow up. [15] [16]

Another study reported in which 120 participants were admitted for bariatric surgery out of which 38 were morbidly obese people with history of chronic back pain.

The Visual Analog Scale (VAS) pain scores for low back were 5.2 at preoperative and 2.9 at postoperative. 68% of the patients reported improvement in pain at the year of follow-up. They also showed significant decrease in the self-reported back pain-related disability at the postoperative assessment [17] [18] [19]

This association may contribute to aggravate the disease. None of the currently available treatment modalities is entirely satisfactory and novel therapies based upon a clearer understanding of the disease at the psychological, genetic, mechanical, microvascular and microscopic level are require

Conclusion

Obesity is associated with decrease in joint mobility and worsening of CVD.

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