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Does Increased Body Mass Index Cause Pain and Impact Overall Quality of Life in Case of Venous Insufficiency?

*Vücut Kütle İndeksinin Artması Venöz Yetmezlikte Ağrıyı ve Genel Yaşam Kalitesini Etkiler mi?**

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ABSTRACT

Objective: Chronic venous insufficiency is the most common vascular disease of the lower extremity. It is predicted that obesity, which is one of the risk factors of venous insufficiency, would influence the clinical appearance of the disease. The purpose of this study is to investigate the changes in pain scores and overall quality of life of patients with venous insufficiency, according to body mass index.

Materials and Methods: Patients (n:63) who applied to the sports medicine clinic with lower extremity pain, and were found to have venous insufficiency in examinations were included in the study. After noting their demographic data, patients' height and body weight measurements were performed and body mass indices calculated. The patients were divided into four groups based on their body mass index (BMI). The visual analog scale and the EQ5D quality of life scale were then applied to the patients.

Results: According to their BMI, there were 16 patients in Group 1 (22.6 kg/m^2), 23 patients in Group 2 (27.5 kg/m^2), 17 patients in Group 3 (32.6 kg/m^2), and seven patients in Group 4 (37.5 kg/m^2). There were no statistically significant differences between the groups in terms of demographic data or degree of venous insufficiency. The visual analog scale score and the EQ5D score were 4.1 ± 2.9 and 0.7 ± 0.2 in Group 1; 4.7 ± 2.9 and 0.6 ± 0.3 in Group 2; 6.3 ± 2.1 and 0.5 ± 0.1 in Group 3; and 7.9 ± 2 and 0.3 ± 0.2 in Group 4, respectively. Statistical analysis revealed a statistically significant difference between the groups in terms of their EQ5D score (p:0.01). Although visual analog scale score increased in parallel with body mass index, there was no statistically significant difference (p:0.055). Body mass index was found to be negatively and moderately correlated with pain (p:0.004, r: -0.40) and overall quality of life (p:0.003, r: -0.40).

Conclusions: This study revealed that the increase in body mass index affects pain and quality of life independently of the severity of insufficiency.

Key Words: Venous insufficiency, obesity, pain, quality of life

ÖZ

Amaç: Kronik venöz yetmezlik, alt ekstremitede en sık görülen damar hastalığıdır. Hastalığın risk faktörlerinden olan obezitenin venöz yetmezliğin kliniğini de etkileyeceği öngörülmektedir. Bu çalışmanın amacı, venöz yetmezliği bulunan hastaların ağrı skorlarındaki ve genel yaşam kalitelerindeki değişimin vücut kütle indekslerine göre incelenmesidir.

Gereç ve Yöntemler: Spor Hekimliği kliniğine alt ekstremite ağrısı yakınması ile başvuran ve yapılan tetiklerinde venöz yetmezlik saptanan 63 hasta çalışmaya dahil edildi.

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Hastaların demografik verileri kaydedildikten sonra, boy ve vücut ağırlığı ölçümleri yapılarak vücut kütle indeksleri hesaplandı. Hastalar vücut kütle indekslerine göre dört gruba ayrıldı.Hastalara, görsel ağrı skalası ve EQ5D genel yaşam kalite anketi uygulanarak sonuçları kaydedildi.

Bulgular: Grup 1 (22.6 kg/m^2)'de 16 hasta; Grup 2 (27.5 kg/m^2)'de 23 hasta; Grup 3 (32.6 kg/m^2)'te 17 hasta ve Grup 4 (37.5 kg/m^2)'te yedi hasta vardı. Hastaların demografik verileri ve venöz yetmezlik derecesi açısından istatistiksel farklılığı yoktu ($p>0.05$). Görsel ağrı skalası skoru ve EQ5D genel yaşam kalitesi puanı sırasıyla Grup 1'de 4.1 ± 2.9 ve 0.7 ± 0.2; Grup 2'de 4.7 ± 2.9 ve 0.6 ± 0.3; Grup 3'te 6.3 ± 2.1 ve 0.5 ± 0.1; Grup 4'te 7.9 ± 2.0 ve 0.3 ± 0.2 idi**.** İstatistiksel değerlendirme sonucu, gruplar arasında EQ5D puanlarında istatistiksel anlamlı fark olduğu saptandı (p:0.01). Görsel ağrı skalası skoru vücut kütle indeksi arttıkça artış göstermekle birlikteistatistiksel anlamlı fark oluşturmadı (p:0.055). Vücut kütle indeksinin, ağrı (p:0.004, r: -0.40) ve genel yaşam kalite ölçeği (p:0.003, r: -0.40) ile orta düzeyde negatif yönlü korrelasyonu bulundu.

Sonuç: Bu çalışmada, vücut kütle indeksi artışının yetmezlik derecesinden bağımsız olarak ağrı ve yaşam kalitesini etkilediği gösterilmiştir.

Anahtar Sözcükler: Venöz yetmezlik, obezite, ağrı, yaşam kalitesi

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**Bu çalışma, "Venöz yetmezlikli hastalarda kalf kası egzersizlerinin venöz fonksiyona ve kas gücüne etkisi (The effect of calf muscle exercises on venous functions and muscle strength in patients with chronic venous insufficiency)" başlıklı tıpta uzmanlık tezinden üretilmiştir.*

INTRODUCTION

Obesity is a community health problem that is increasing throughout the world at an alarming rate (1,2). More than one billion people across the world are overweight, while 300 million suffer from obesity (3). More than 50% of the adults in the United States have a body mass index in the 25.0-29.9 kg/m^2 range, almost one third have a body mass index above 30 kg/m^2 and 5% have a body mass index above 45 kg/m^2 (4,5). In addition to adults, 14-18% of American children have been found to be overweight, while 80% of individuals between the ages of 11 and 15 have been found to have multiple risk factors related to physical inactivity and diet (4,6). In Turkey, 17.2% of the individuals over the age of 15 have obesity, 34.8% are overweight, 44.2% have normal body weight, and 3.9% are underweight. In terms of gender, 20.9% of women are obese and 30.4% are overweight, while 13.7% of men are obese and 39.0% are overweight (7).

The prevalence of obesity is high in all nations across the world and has been increasing in recent years (8). This has led to an increase in the prevalence of other diseases such as cancer, diabetes, insulin resistance, arthritis, hypertension, hyperlipidemia, heart diseases, and vascular diseases as well, since it is a risk factor for these diseases (7,9-11). Obesity does not only increase the risk of these diseases, but also weakens physical functions of patients, increases their sense of pain, and reduces quality of life (8). In one study conducted in the general population, it was reported that life quality of underweight individuals or obese individuals decreased, and increased body mass index led to negative effects on health (12). Multiethnic general population studies revealed that diabetes, hypertension, cardiovascular diseases, and musculoskeletal system diseases caused decrease in quality of life on their own (13). In another study, it was pointed out that many different psychosocial factors affected quality of life, but obesity was the most significant independent factor for low quality of life (14).

Chronic diseases accompanied by obesity are expected to worsen the quality of life. For example, patients with moderate or severe osteoarthritis and obesity were reported to have more limited activity and higher pain (15). Gardner et al. reported that individuals with metabolic syndrome and obesity had worse physical function, health-related quality of life, intermittent claudication, and peripheral circulation (16). Oeser et al. found that obesity was an independent risk factor for lower functional capacity and higher

inflammatory marker levels in patients with lupus erythematosus (8).

Çetin el al. found that subjective pain sensation increased in parallel with disease severity (17), while Rossi et al. disclosed that health-related quality of life decreased in parallel with disease severity in patients suffering chronic venous insufficiency (18). However, the number of studies on the pain level and health-related quality of life according to body mass index levels in patients with chronic venous insufficiency is limited. This study is designed to cover this gap. The purpose of this study is to investigate the change in pain scores and overall quality of life of patients with venous insufficiency according to body mass index.

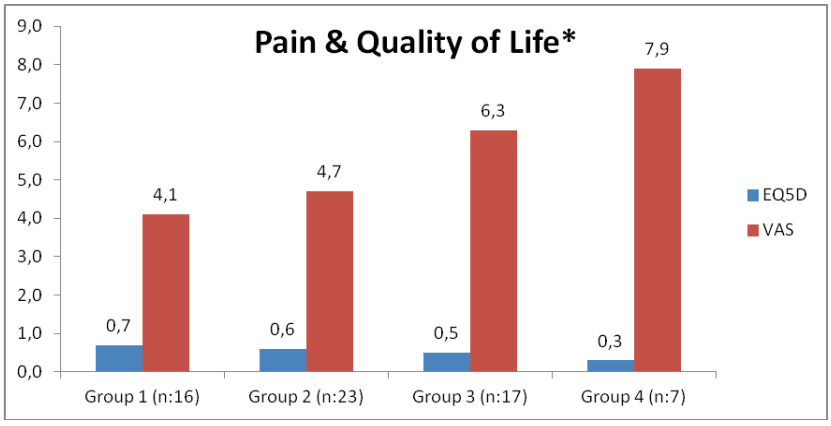
MATERIAL and METHODS

A total of 63 patients admitted to the sports medicine clinic, with lower extremity pain and who were found to have venous insufficiency through clinical examinations and photoplethysmography measurements (17) were enrolled in this study. The patients had no history of lower extremity injury or surgery, osteoarthritis and drug use. After noting demographic data of the patients, height and body weight measurements were performed to calculate body mass index. Patients were divided into four groups based on their body mass index values: those with a body mass index between 18.5-24.9 kg/m^2 (Group 1); those with a body mass index between 25.0-29.9 kg/m^2 (Group 2); those with a body mass index between 30.0-34.9 kg/m^2 (Group 3), and those with a body mass index over 35.0 kg/m^2 (Group 4), (19). Patients who suffered bilateral venous insufficiency were considered to be more severe.

Table 1. Physical characteristics

Parameters	Group 1 (n:16)	Group 2 (n:23)	Group 3 (n:17)	Group 4 (n:7)	p value
Age (yrs)	44.8 ± 11.1	46.8 ± 10.1	49.4 ± 6.4	49.2 ± 1.3	0.80
Height (cm)	159.0 ± 6.7	160.5 ± 6.8	161.4 ± 8.4	152.6 ± 3.9	0.20
BW (kg)	57.1 ± 6.2	70.9 ± 6.7	84.8 ± 8.0	87.2 ± 3.2	0.001*
BMI (kg/m^2)	22.6 ± 1.8	27.5 ± 1.5	32.6 ± 1.6	37.5 ± 2.0	0.001*
VRT (s)	12.1 ± 2.1	13.9 ± 6.2	13.4 ± 4.9	10.0 ± 3.8	0.40

BW: body weigth, BMI: body mass index, VRT: venous refilling time, *: statistical significance (p<0.05)



VAS: visual analog scale, EQ5D: EuroQol-5 dimension quality of life scale, *: p<0.05

Figure 1. VAS pain score and EQ5D quality of life score (n: 63)

The visual analog scale (VAS) was used to determine the level of pain (18), and the EQ5D scale was used to assess the life quality (12). The visual analog scale involves the patient's subjective interpretation of pain between 0 and 10 on a visual scale (18). The EQ5D scale which was tested for Turkish validity and reliability by Kahyaoğlu assesses quality of life under the following dimensions: mobility, self-care, usual activities, pain/discomfort & anxiety/depression. The subject chooses one of the three options ('no problem', 'some problem', and 'major problem') for each item. A total of 243 different possible health results are identified using the scale and an index score varying between 0 and 1.00 is produced as a result (20). The Local Ethics Committee approved the study.

Statistical Analysis

SPSS v22.0 software was used for data analysis. Descriptive statistics was utilised to identify the data and the Kruskal Wallis test was applied to determine differences among independent groups. In parameters where a difference was detected, Bonferroni corrected Mann Whitney-U test was applied to determine which groups caused the difference. Pearson correlation analysis was done to determine the relationship between the scales and body mass index. Statistical significance level was accepted as $p<0.05$. Results were presented as mean ± standard deviation.

RESULTS

There were 16 patients (15 females/one male, four unilateral/12 bilateral extremity) in Group 1; 23 patients (18 females/five males, eight unilateral/15 bilateral extremity) in Group 2; 17 patients (15 females/two males, two unilateral/ 15 bilateral extremity) in Group 3; and seven patients (all females and bilateral extremity) in Group 4. There were no statistically significant differences between the groups in terms of age, height, sex, affected extremity, or degree of venous insufficiency ($p>0.05$), (Table 1).

The VAS score and the EQ5D score were 4.1 ± 2.9 and 0.7 ± 0.2 in Group 1; 4.7 ± 2.9 and 0.6 ± 0.3 in Group 2; 6.3 ± 2.1 and 0.5 ± 0.1 in Group 3; and 7.9 ± 2 and 0.3 ± 0.2 in Group 4, respectively. Statistical analysis revealed significant difference between the groups in terms of the EQ5D score (p:0.01). Although VAS score increased in parallel with body mass index, there was no statistically significant difference (p:0.055). Furthermore, significant differences were determined between Group 1 and Group 3 (p:0.04), Group 1 and Group 4 (p:0.009), and Group 2 and Group 4 (p:0.02) in terms of the EQ5D scores (Figure 1.). Among the parameters analysed with Pearson correlation, body mass index was found to be negatively and moderately correlated with pain (p:0.004, r: -0.40) and overall quality of life (p:0.003, r: -0.40) only.

DISCUSSION

It was found in this study that increased body mass index led to an increase in pain and decreased health-related quality of life in chronic venous insufficiency patients with similar clinical stages and refilling times. Body mass index was found to be negatively correlated with pain and quality of life.

Venous diseases are frequently seen in the society, particularly in women, and impose high socio-economic burden, thereby causing loss of labour and decreased quality of life (21,22). Major risk factors concerning the disease include genetic predisposition, standing for prolonged periods of time, thrombophlebitis and lower extremity history, number of pregnancies and obesity (23). Most studies in the literature focus on the relationship between pain level and disease stage in patients with chronic venous insufficiency (18). In addition to pain, there are also studies focusing on the correlation of degree of clinical findings and progress of the disease with health-related quality of life (18,24).

Recent studies investigated clinical effects of stage and severity of chronic venous insufficiency and reported that progression of the disease increased symptoms in patients. When progress of the disease was stopped or slowed down by medical

or exercise treatment, it was observed that subjective assessments of patients were positively affected; pain decreased, independence increased, and quality of life improved (22,25,26). On the other hand, health authorities are alarmed by obesity as an epidemic affecting all nations across the world. Strategic plans are developed in an attempt to minimize the burden caused by obesity on individuals and communities. Given this, it is a matter of interest how obesity affects complaints of patients with accompanying chronic diseases, and how these patients should be treated. In studies on different diseases such as vascular disease, diabetes and metabolic syndrome, it was found that characteristic findings and course of disease might change, and that symptoms might increase when accompanied by high body mass index/obesity (11,14,23,27).

The CEAP classification (classification of severity of varicose veins) and other venous scoring systems, which classify venous insufficiency do not consider body mass index. Padberg et al. (27) designed their study by taking into account this gap in the literature and reported that patients with morbid obesity developed more serious venous symptoms. Typical chronic venous insufficiency symptoms were observed in one third of patients with a body mass index over 40 kg/m^2, and it was reported that increased body mass index led to increased symptoms in patients (27). Rossi et al. reported that patients with higher clinical degree according to the CEAP classification had higher body mass index values, although they were not statistically significant. Also, it was highlighted that pain and health-related quality of life were affected by increased clinical severity according to CEAP (18).

In a study where patients who randomly received four different treatment options were followed-up for six months, it was reported that there was no difference between treatment groups and that the negative effect of the disease on the quality of life increasingly continued despite treatment (28). In another study from Turkey, factors such as advanced age, high body mass index, prolonged working times, and regular drug use were found to be correlated with decreased quality of life (29).

Although this is the first study in the literature that investigates clinical symptoms according to body mass index classification, it has certain limitations. The first limitation is the inability to analyse other parameters which might have affected the clinical appearance of the disease. The second limitation is the low number of patients in the study. This study does not include any patients in the underweight (<18.5 kg/m^2) and extreme obesity (>40 kg/m^2) categories according to World Health Organization's body mass index classification. The third limitation is a result of the fact that the study was carried out in a hospital, and only those patients possibly with more pain have applied to a physician, which might have influenced the results.

CONCLUSION

It was found in our study that the increase in body mass index led to an increase in pain level and a decrease in health-related quality of life. Obesity is known to be one of the manageable risk factors of chronic venous insufficiency. Cumulative symptoms of venous insufficiency also increase when the disease is accompanied by obesity. As in many chronic diseases (30), primary treatment of venous insufficiency must include lowering body weight to an optimal level and fighting obesity.

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