



Evaluation of quality of life after minimally invasive varicose vein treatment

Minimal invaziv varis tedavisi sonrası yaşam kalitesinin değerlendirilmesi

Pelin Tuncer Çoban¹, Elif Dirimeşe²

Institution where the research was done:

Faculty of Health Sciences, Bulent Ecevit University, Zonguldak, Turkey

Author Affiliations:

¹Department of Orthopedics and Traumatology, Tunceli State Hospital, Tunceli, Turkey

²Department of Nursing, Faculty of Health Sciences, Bulent Ecevit University, Zonguldak, Turkey

ABSTRACT

Background: This cross-sectional study aims to evaluate the changes in quality of life after minimally invasive procedures in patients with varicose veins.

Methods: The study included 150 patients (58 males, 92 females; mean age 47.1±12.0; range, 19 to 80 years) with varicose veins who were treated using minimally invasive techniques. Data were collected using patient information forms and the Venous Insufficiency Epidemiological and Economic Study-Quality of life/Symptoms questionnaire. Before the minimally invasive procedures, patients were informed about varicose veins and medical approaches for relief. They were also provided information about the use of compression stockings. Varicose vein symptoms and quality of life were evaluated before the minimally invasive procedures and four weeks following the last operation.

Results: Females, individuals aged between 51-60 years, those with Body Mass Index >30, or having had a pregnancy had higher prevalence of variceal disease and lower quality of life. Clinical severity of the disease decreased and the quality of life improved in patients treated with minimally invasive procedures. After treatment, 45.33% of patients put on compression stockings regularly for one month.

Conclusion: After minimally invasive treatment, severe disease symptoms decreased and quality of life increased in patients with varicose veins. Lifestyle modifications, use of compression stockings, and roles of nurses and healthcare workers are significant in maintaining healthy veins.

Keywords: Compression stockings; nursing care; quality of life; varicose veins; venous insufficiency.

ÖZ

Amaç: Bu kesitsel çalışmada varisli hastalarda minimal invaziv işlemler sonrasında yaşam kalitesindeki değişimler değerlendirildi.

Çalışma planı: Çalışmaya minimal invaziv tekniklerle tedavi edilen varisli 150 hasta (58 erkek, 92 kadın; ort. yaş 47.1±12.0 yıl; dağılım 19-80 yıl) dahil edildi. Veriler hasta bilgi formları ve Venöz Yetmezlikte Epidemiyolojik ve Ekonomik Çalışma-Yaşam Kalitesi/Semptomlar Anketi kullanılarak toplandı. Minimal invaziv işlemlerden önce, hastalar varisler ve rahatlama amaçlı tıbbi yaklaşımlar hakkında bilgilendirildi. Ayrıca, kompresyon çoraplarının kullanımı hakkında da kendilerine bilgi sağlandı. Varis semptomları ve yaşam kalitesi minimal invaziv işlemlerden önce ve son işlemten dört hafta sonra değerlendirildi.

Bulgular: Kadınlar, 51-60 yaş aralığındaki bireyler, Vücut Kütle İndeksi >30 olanlar veya gebelik geçirmiş olanlarda varis hastalığı prevalansı daha yüksek ve yaşam kalitesi daha düşük idi. Minimal invaziv işlemler ile tedavi edilen hastalarda hastalığın klinik şiddeti azaldı ve yaşam kalitesi düzeldi. Tedavi sonrası, hastaların %45.33'ü bir ay boyunca düzenli olarak kompresyon çorabı giydi.

Sonuç: Minimal invaziv tedavi sonrası varisli hastalarda şiddetli hastalık semptomları azaldı ve yaşam kalitesi arttı. Yaşam tarzı değişiklikleri, kompresyon çorabı kullanımı ve hemşire ve sağlık çalışanlarının rolleri damar sağlığının korunmasında önemlidir.

Anahtar sözcükler: Kompresyon çorabı; hemşirelik bakımı; yaşam kalitesi; varis; venöz yetmezlik.

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Correspondence: Elif Dirimeşe, PhD, RN, Lecture, Zonguldak Bülent Ecevit Üniversitesi Sağlık Bilimleri Fakültesi Hemşirelik Bölümü, 67600 Kozlu, Zonguldak, Turkey. Tel: +90 372 - 261 33 42 e-mail: elifim67@gmail.com

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Varicose veins in lower extremities are a common health problem that negatively affect daily life and impair quality of life (QoL). Varicose veins are caused by venous reflux in lower extremity superficial veins. It not only causes cosmetic problems, but also serious problems including non-healing wounds in lower extremities.^[1-3] Symptoms caused by varicose veins include blunt pain, feelings of heaviness, night cramps, itchiness or tingling, warmth or burning sensation, exhaustion, swelling, and restless legs. These symptoms generally arise when the patients are in a resting state and often limit daily activities. However, most patients continue to perform their activities of daily living without being treated. Thus, the disease becomes chronic and the clinical severity increases.^[2] Although there are no definitive data regarding the prevalence of varicose veins, studies conducted in Europe and America have determined that this problem is seen in 50% of people aged over 40.^[1] It has been found that 20-40% of the adult population suffer from the problem of varicose veins.^[4] A study in America revealed that varicose veins are seen most often in people of Spanish origin among races, whereas this disease is less common in people of African origin.^[5]

In the treatment of varicose veins, patients are first educated about changing their lifestyles. Then, other medical interventions including compression, pharmacological and surgical treatments are added.^[6,7] The aim of patient education is to reduce symptoms felt from varicose veins, prevent the progression of varicose veins, and prevent the development of complications. Nurses play an important role in ensuring patient education.^[6,8] Compression stockings used in the primary care of the disease are support products that apply pressure on the leg and prevent venous edema.^[7] Andeoizzi et al.^[9] revealed that the use of compression stockings in patients with chronic venous stasis increases their QoL.

Surgical methods used in the treatment of varicose veins vary with technological advancement. Rather than open surgery, minimally invasive procedures are used currently as the first choice in the treatment of varicose veins with the recommendations of the guidelines of the Society for Vascular Surgery, American Venous Forum, and European Society for Vascular Surgery. Since minimally invasive procedures shorten the length of hospitalization, do not require general anesthesia, reduce the incidence rate of complications, enable patients to return to normal activities quickly, and are as effective as open surgery, these procedures are preferred.^[10-12] These procedures include endovenous

laser ablation (EVLA), radiofrequency ablation (RFA), and sclerotherapy. Endovenous laser ablation and RFA treat varicose veins by creating thermal damage.^[3] Several randomized studies concluded that EVLA has advantages over open surgery.^[13-16] One of the most intensively discussed topics about these treatments is the wavelength. The most important factor is the energy that should be given in order to keep the vein closed. Thus, the risk of reopening the vein with high energy is reduced. One of the different approaches in recent years is the introduction of lower energy with lasers at higher energy lengths. Reopening rates may increase in this way, but decreased complication and increased patient satisfaction can be seen.^[3] The most common complication is ecchymosis while the other complications are paresthesia, hyperesthesia, phlebitis, cellulitis, endurance, hematoma, edema, burns, hyperpigmentation, deep vein thrombosis and infection in the interventional zone.^[17] These complications may not be seen at all, and may be seen in up to 15% of the total incidence.^[3] Yalçın et al.^[18] reported similar postoperative complications and success rates for EVLA and RFA methods at the end of six months. Another study revealed that the QoL of patients with varicose veins increased six months after minimally invasive procedures.^[19] Likewise, Thompson et al.^[20] compared patients with varicose veins who underwent RFA or open surgery procedures and found that the QoL increased after the RFA procedure particularly for female patients. Therefore, in this study, we aimed to evaluate the changes in QoL after minimally invasive procedures in patients with varicose veins.

PATIENTS AND METHODS

This cross-sectional study was conducted in Zonguldak Atatürk State Hospital located in Western Black Sea region between May 2016 and March 2017. The sample of this study was calculated as $d=1.26$, $\delta=15.15$ and $p=0.05$ and $\text{power}=1.0$. The sample included 150 patients (58 males, 92 females; mean age 47.1 ± 12.0 ; range, 19 to 80 years) with varicose veins who were treated using minimally invasive procedures. Minimally invasive procedures performed were EVLA and RFA. Inclusion criteria were willing to participate in the research, patients over 18 years of age and not having any communication obstacles. The study protocol was approved by the Human Research Ethics Committee, the Bülent Ecevit University (dated 05.05.2016 and numbered 122). A written informed consent was obtained from each patient. The study was conducted in accordance with the principles of the Declaration of Helsinki.

For data collection, we used the patient information form and the Venous Insufficiency Epidemiological and Economic Study-QoL/Symptoms (VEINES-QoL/Sym) questionnaire. The patient information form assessed information about patients' sociodemographic characteristics, medical history, and lifestyle. The VEINES-QoL/Sym scale obtains two scores: VEINES-QoL, which provides information about QoL, and VEINES-Sym, which provides information about the severity of symptoms. The VEINES-QoL/Sym scale examines venous findings (9 items) consisting of five different frequencies (daily, several times a week, once a week, once every few weeks, ever), constraints on daily activity (8 items), pain intensity in the leg (1 item), time of day the problems on the leg are most intense (1 item), changes in the last one year (1 item), social effects (1 item) and psychological effects (5 items). The scale consists of 26 items. Responses are scored using the Likert response scale, ranging from two to seven points of intensity, frequency, or disagreement. The VEINES-Sym total score is obtained by summing the scores of the responses given to the nine items for venous findings. At least nine and a maximum of 45 points are obtained. When calculating the total VEINES-QoL score; third, fourth, fifth, sixth, seventh and eighth answers and the answers given to the sub-items of these questions are collected and total points are obtained. The question for the time of day the problems on the leg are most intense is not included in the total score. It provides only descriptive information. At least 15 and a maximum of 67 points are obtained. Kutlu et al.^[21] performed the Turkish validity and reliability analyses of the scale. The Cronbach's alpha value was 0.81 and 0.86 for VEINES-Sym and VEINES-QoL, respectively. The total VEINES-Sym score provides information about the severity of symptoms. Higher scores on VEINES-Sym scale indicate that the disease is less severe and has less effect on the life of the patient. On the other hand, higher scores on VEINES-QoL show that the patient has a higher level of QoL. This study assessed the QoL of patients at the fourth week before and after the minimally invasive procedures. Only one surgeon intervened in the patients to prevent any possible differences in the surgical technique.

A verbal education was provided to patients using an educational booklet prepared in light of the relevant literature. This education included issues such as definition of the disease, risk factors of disease formation, symptoms, diagnosis methods, preventive measures, treatment methods, use of compression stockings, and discharge education. This training was given to all patients by the same researcher nurse.

Radiofrequency ablation was performed with local or regional anesthesia. Ultrasound-guided catheter and 6 or 7 French (F) vascular sheath were placed with Seldinger technique in the superficial vein with reflux. Radio frequency energy was applied for twenty seconds to warm up the venous wall to 120 degrees. The congestion of vein was created. The catheter was withdrawn at 2-4 cm per minute. To perform the EVLA procedure, a 21 Gauge (G) micro needle was inserted through the distal end of the vein under ultrasound guidance, and vascular sheath was placed. The laser source was operated and energy was controlled at about 60 Joule/cm. The vein was internally blocked. None of the patients in the sample had any early or late complications.

Statistical analysis

The statistical analysis was performed using the IBM SPSS statistics for Windows, version 19.0 (IBM Corp., Armonk, NY, USA). This study used the Kolmogorov-Smirnov distribution test to examine the sociodemographic and clinical characteristics of patients, frequencies, percentages, means, standard deviation, and normal distribution. The Mann-Whitney U test and Kruskal-Wallis test were used to compare quantitative data. For intra-group comparisons, the Wilcoxon signed rank test was used. Results were evaluated at the 95% confidence interval and $p < 0.05$ significance level.

RESULTS

Table 1 shows the sociodemographic characteristics of the 150 participating patients. Of the patients, 61.3% were females, 35.3% were aged between 51 and 60, 42.7% were obese, 86.7% were married, 56% were primary school graduates, 52.7% were housewives, and 54% generally worked while sitting. All patients had social insurance (Table 1).

Table 2 shows information about patients' health statuses and diseases. Of the patients, 94% stayed in the hospital for one day, 61.7% suffered from hypertension, 77.3% had not experienced varicose veins before, 57.3% did not have any family history of varicose veins, 88% had been hospitalized before, 75.3% had a history of surgery, 18.7% had used oral or injectable contraceptives, 96.7% had a history of pregnancy, and 26.3% had a history of five or more pregnancies (Table 2). In this study, 66% of the patients were non-smokers, 83.3% did not consume alcohol, 60.7% mainly ate a plant-based diet, 84% preferred casual clothes, and 75.3% had never used high-heel shoes (Table 3).

Table 4 shows how patient complaints due to venous insufficiency before and after the minimally invasive procedures affected severity of symptoms and QoL. Compared to the pre-operational VEINES-Sym value, there was a statistically significant increase in VEINES-Sym value obtained after the minimally

invasive procedure (Wilcoxon $Z=-10.432$; $p=0.001$). Compared to pre-operational VEINES-QoL value, there was a statistically significant increase in VEINES-QoL value after the minimally invasive procedure (Wilcoxon $Z=-9.647$; $p=0.001$) (Table 4). Varicose veins were more common in females and the QoL for female patients was worse compared to male patients ($p=0.010$). Moreover, the QoL for female patients after the minimally invasive procedure improved more quickly than it did for males ($p=0.016$). According to our study findings, varicose veins occurred most frequently in people aged between 51 and 60 years. There was no significant difference between changes in the QoL and the severity of disease symptoms before and after the minimally invasive procedure according to age group ($p>0.05$).

Table 1. Sociodemographic characteristics of patients (n=150)

	n	%	Mean
Age (year)			47.9
Age group			
30 years and younger	11	7.3	
31-40 years	38	25.3	
41-50 years	32	21.3	
51-60 years	53	35.3	
61 years and older	16	10.7	
Gender			
Female	92	61.3	
Male	58	38.7	
Body Mass Index group			
Slim	3	2.0	
Normal	29	19.3	
Slightly overweight	54	36.0	
Obese	64	42.7	
Marital status			
Single	20	13.3	
Married	130	86.7	
Educational status			
Illiterate	15	10.0	
Primary school graduate	84	56.0	
Secondary school graduate	24	16.0	
High school graduate	22	14.7	
Bachelor's degree	5	3.3	
Profession			
Housewife	79	52.7	
Civil servant	2	1.3	
Worker	5	3.3	
Other occupational groups	64	42.7	
Working style			
Working by sitting always	15	10.0	
Working by sitting mostly	81	54.0	
Working by sitting rarely	3	2.0	
Working on foot always	51	34.0	
Residence			
Province	24	16.0	
District	90	60.0	
Village	36	24.0	
Public insurance			
Yes	150	100	
No	0	0	
Total	150	100	

Table 2. Status of health and disease

	n	%
Length of hospitalization		
One day	141	94.0
Two days	9	6.0
Type of chronic disease		
Hypertension	29	61.7
Diabetes mellitus	7	14.9
Asthma	5	10.6
Other	6	12.6
Experienced varicose veins before		
Yes	34	22.7
No	116	77.3
Family history of varicose veins		
Yes	64	42.7
No	86	57.3
History of previous hospitalization		
Yes	132	88.0
No	18	12.0
History of surgery		
Yes	113	75.30
No	37	24.77
Contraceptive use		
Using	17	18.7
Not using	133	81.3
History of pregnancy		
Yes	88	95.7
No	4	4.3
Number of pregnancies		
1	4	4.6
2	27	31.0
3	18	20.7
4	15	17.2
5 or more	23	26.3
Total	150	100

Table 3. Patient lifestyles

	n	%
Smoking		
Yes	51	34.0
No	99	66.0
Number of cigarettes smoked daily		
Less than 10	13	25.5
10-20	36	70.6
More than 20	2	3.9
Alcohol use		
Yes	25	16.7
No	125	83.3
Frequency of alcohol use		
Rarely	20	80.0
Every day	5	20.0
Food preference		
Mainly animal-based foods	34	22.7
Mainly plant-based foods	91	60.7
Mainly fast-food	9	6.0
Equally plant-based and animal-based foods	16	10.7
Dressing style		
Preference of casual clothes	126	84.0
Preference of tight-fitting clothes	24	16.0
High-heel shoe		
Not using	113	75.3
Rarely using	32	21.3
Frequently using	5	3.3
Total	150	100

The severity of varicose veins was worse in obese patients than in patients slightly overweight ($p=0.008$, $p<0.05$) and the QoL for slightly overweight patients was better than for obese patients ($p=0.06$, $p>0.05$). However, no significant difference between these groups was determined after the procedure in the severity of the disease or QoL ($p>0.05$).

The incidence rate of varicose veins in people working while sitting was high, and they experienced increased severity of varicose veins ($p=0.010$, $p<0.05$). The QoL for people working while standing was higher than for those working while sitting before the minimally invasive procedure ($p=0.011$, $p<0.05$). In addition, after the minimally invasive procedure, the QoL for people working while standing was higher than those who sat ($p=0.001$, $p<0.05$).

There was no significant difference between the symptoms of disease before and after the procedure according to the variable of pregnancy ($p>0.05$). However, patients with a history of pregnancy had a poorer QoL ($p=0.033$, $p<0.05$).

Varicose veins were more common in people with no chronic disease than in people with hypertension, diabetes, asthma, or other chronic diseases. There was no significant difference between groups with a chronic disease and a history of varicose veins, and with no chronic disease and a history of varicose veins in terms of the QoL or the clinical severity of the disease ($p>0.05$).

The QoL of patients who had a plant-based diet was better than those who predominantly ate fast food both before and after the minimally invasive procedure; however, there was no difference in the clinical severity of the disease before and after the minimally invasive procedure according to dietary habits ($p>0.05$).

Of the patients, 84% preferred to wear casual clothes and 75.3% preferred not to wear high-heel shoes. The clinical severity of disease and the QoL before and after the minimally invasive procedure according to the preference for clothes and shoes was not different ($p>0.05$).

After the minimally invasive procedure, patients were recommended to use compression stockings for

Table 4. Venous insufficiency epidemiological and economic study-quality of life/symptoms questionnaire findings

	Mean±SD	Min.	Max.
Preoperative VEINES-Sym	21.8±9.4	9	45
Postoperative VEINES-Sym	40.8±5.4	22	45
	Wilcoxon Z = -10.432, p=0.001		
Preoperative VEINES-QoL	40.3±8.4	25	62
Postoperative VEINES-QoL	51.0±3.6	35	59
	Wilcoxon Z = -9.647, p=0.001		

SD: Standard deviation; Min.: Minimum; Max.: Maximum; VEINES-Sym: Venous Insufficiency Epidemiological and Economic Study-Symptoms; VEINES-QoL: Venous Insufficiency Epidemiological and Economic Study-Quality of Life.

approximately three months.^[17] An evaluation carried out after one month revealed that 45.33% of the patients regularly used compression stockings. During this period, patients who used stockings felt better and their complaints of pain and edema decreased. However, 48% reported that they did not use compression stockings regularly because they found them irritating.

DISCUSSION

Varicose veins are an important health problem that mostly affects the adult population. Due to its symptoms including pain, edema, itchiness, cramp, and feeling of heaviness, varicose veins limit the performance of daily living activities and have negative effects on QoL. Nurses can easily diagnose such symptoms affecting QoL by inspection.^[22] Age, gender, pregnancy, and lifestyles are factors reported to affect the course of the disease. Quality of life has recently become an important issue in the healthcare field and gained importance after surgical treatment.^[23,24]

This study assessed the QoL of patients receiving minimally invasive treatment and care for varicose veins before and after the procedure. The symptoms patients experienced decreased and their QoL increased following the procedure. These results are largely in agreement with the literature. Beresford et al.^[24] emphasized that the QoL of patients with primary and recurrent varicose veins is low. Mallick et al.^[25] reported that more than half of the patients suffering from varicose veins have difficulties performing activities of daily living and suffer from negative psychological effects.

The present study determined decreased symptoms and increased QoL in participating patients one month after the procedure. Moreover, more than half of the patients returned to their daily routines within a month. This finding is largely in agreement with the literature. Cotton et al.^[26] emphasized that 95% of their study sample returned to their daily routines within six weeks after the minimally invasive procedure, and their QoL increased. Other study results demonstrated that patients treated with minimally invasive procedures experience less clinically severe disease and have increased QoL six months after the procedure.^[23,27] The literature states that minimally invasive procedures are a comfortable and reliable method for these patients.^[10,11,12,28]

Various studies examining the epidemiology of varicose veins, risk factors, and patient factors during treatment have determined that this disease is more common in females, while the course of

disease and the QoL are also worse for females.^[29-31] Nurses play a key role in determining patients at risk in terms of diagnosis and early intervention.^[22] Thompson et al.^[20] emphasized that female patients who received RFA treatment are more satisfied than those receiving traditional surgery methods. The present study also found that the QoL for female patients improved more quickly than for males after the minimally invasive procedure. However, some studies report different results. Ceviker et al.^[32] emphasized that gender has no effect on the QoL while Lee et al.^[31] found that varicose veins are more common in male patients.

The disease incidence increases and the disease course worsen because of impaired vein structure with increasing age.^[30-33] In the present study, varicose veins were more common in median-age group patients. Obesity increases the risk of the formation of varicose veins and decreases the QoL.^[34-37] The present study found similar results. Clark et al.^[29] emphasized that the prevalence of varicose veins is three times more common in people with Body Mass Index >30.

The literature has reported that always standing or always sitting while working causes deterioration in vascular structure.^[2,37] The present study also obtained a similar result: Working while sitting for a long time increased the incidence of varicose veins. Laurikka et al.^[34] reported that the prevalence of varicose veins is higher in people working while always sitting, whereas Lee et al.^[31] determined no significant relationship between the prevalence of varicose veins and the working style.

Many studies state that a history of one or more pregnancies increases the risk of varicose veins formation due to pregnancy weight gain.^[23,36] However, Lee et al.^[31] reported no significant relationship between the prevalence of varicose veins and the number of pregnancies. The present study also did not determine any significant difference between the disease symptoms of patients with a history of pregnancy before and after the minimally invasive procedure. Because of pregnancy, which leads to venous insufficiency, QoL is affected negatively.^[33] The present study found that the QoL of patients with a history of pregnancy was lower.

Cardiovascular disorders are among the risk factors for varicose veins, and the prevalence of varicose veins is higher in people with chronic disease, deep vein thrombosis, and hypertension.^[5,30] The present study did not find any significant difference between chronic disease, history of varicose veins, and QoL.

The literature shows that smoking habit is among the risk factors increasing the prevalence of varicose veins.^[33,38] However, a study by Joseph et al.^[37] examining the epidemiology of varicose veins emphasized that there is no significant difference between smoking and the formation of varicose veins. Similarly, our study did not determine any significant difference between the clinical severity of disease and the QoL before and after the minimally invasive procedure based on smoking.

Variables such as having a no-fiber diet, clothing preference, and wearing high-heel shoes may increase the risk for formation of varicose veins.^[33,39] The present study determined that patients with a plant-based diet had higher QoL scores, and that most patients preferred to wear casual clothes (84%) and not to wear high-heel shoes (75.3%). The clinical disease severity and the QoL before and after the procedure were examined according to these variables and no differences were found.

Compression stockings are recommended in the treatment for varicose veins. Nurses play an important role in determining the appropriate socks for patients and ensuring that they use them correctly.^[8,22] The use of compression stocking decreases the clinical severity of the disease and increases the QoL.^[8,40] The present study revealed that patients who regularly used compression stocking after the minimally invasive procedure felt better, and their complaints of pain and edema decreased. However, almost half of the patients did not use compression stockings regularly because they found them irritating. In a study by Özkan et al.,^[8] participating patients reported that they felt uncomfortable because of problems about the use of compression stocking such as having difficulty in wearing them without help and sweating. Nurses have important roles to raise awareness on the benefits of compression stocking, importance of regular use of compression stocking, and changing lifestyles accordingly.^[6,22]

The limitation of this study was the failure to establish a control group due to the limited number of patients accessed.

In conclusion, patients with varicose veins experienced fewer symptoms and their quality of life increased after the minimally invasive procedure. Minimally invasive procedures should be preferred since they have low complication risks, allow patients to return to daily living activities quickly, and increase their quality of life. Further studies are required to investigate the relationship between varicose veins and dietary habits and lifestyle.

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REFERENCES

1. Üzümbağ B, Demirağ MK, Yücel SM, Kolbakır F. Varis tedavisinde açık cerrahi yaklaşım veya endovenöz lazer ablasyon uygulaması sonrasında kısa dönem yaşam kalitesinin karşılaştırılması. *Damar Cer Derg* 2013;22:14-5.
2. Onida S, Lane TR, Davies AH. Varicose veins and their management. *Surgery (Oxford)* 2013;31:211-7.
3. Polat A. Venöz hastalıkların endovasküler tedavisi. In: Polat A, editör. *Endovasküler cerrahiye giriş temel tel ve kateter teknikleri*. İstanbul: Baycınar Tıbbi Yayıncılık; 2106. s. 217-32.
4. Uncu H. Varis cerrahisi erken dönem sonuçlarımız. *Turgut Özal Tıp Merkezi Dergisi* 2012;19:234-6.
5. Brown KR, Rossi PJ. Superficial venous disease. *Surg Clin North Am* 2013;93:963-82.
6. Totur Dikmen B, Dal Yılmaz Ü. Varis cerrahisi ve hemşirelik bakımı. *Türkiye Klinikleri J Surg Nurs-Special Topics* 2018;4:85-92.
7. Bakker NA, Schieven LW, Bruins RM, van den Berg M, Hissink RJ. Compression stockings after endovenous laser ablation of the great saphenous vein: a prospective randomized controlled trial. *Eur J Vasc Endovasc Surg* 2013;46:588-92.
8. Özkan ZK, Fındık ÜY, Ünver S. Hastaların ameliyat sonrası kompresyon çorabı kullanma durumlarının değerlendirilmesi. *F.N Hemşirelik Dergisi* 2016;24:30-7.
9. Andreozzi GM, Cordova R, Scomparin MA, Martini R, D'Eri A, Andreozzi F. Effects of elastic stocking on quality of life of patients with chronic venous insufficiency. An Italian pilot study on Triveneto Region. *Int Angiol* 2005;24:325-9.
10. Gloviczki P, Comerota AJ, Dalsing MC, Eklof BG, Gillespie DL, Gloviczki ML, et al. The care of patients with varicose veins and associated chronic venous diseases: clinical practice guidelines of the Society for Vascular Surgery and the American Venous Forum. *J Vasc Surg* 2011;53:2-48.
11. Wittens C, Davies AH, Bækgaard N, Broholm R, Cavezzi A, Chastanet S, et al. Editor's Choice - Management of Chronic Venous Disease: Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS). *Eur J Vasc Endovasc Surg* 2015;49:678-737.
12. Lawson JA, Gauw SA, van Vlijmen CJ, Pronk P, Gaastra MTW, Tangelder MJ, et al. Prospective comparative cohort study evaluating incompetent great saphenous vein closure using radiofrequency-powered segmental ablation or 1470-nm endovenous laser ablation with radial-tip fibers (Varico 2 study). *J Vasc Surg Venous Lymphat Disord* 2018;6:31-40.
13. Disselhoff BC, der Kinderen DJ, Kelder JC, Moll FL. Randomized clinical trial comparing endovenous laser with cryostripping for great saphenous varicose veins. *Br J Surg* 2008;95:1232-8.

14. Carradice D, Mekako AI, Hatfield J, Chetter IC. A randomised trial of EVLT versus surgery for varicose veins. *Br J Surg* 2009;96(Suppl 1):14.
15. Carradice D, Mekako AI, Mazari FA, Samuel N, Hatfield J, Chetter IC. Randomized clinical trial of endovenous laser ablation compared with conventional surgery for great saphenous varicose veins. *Br J Surg* 2011;98:501-10.
16. Darwood RJ, Theivacumar N, Dellagrammaticas D, Mavor AI, Gough MJ. Randomized clinical trial comparing endovenous laser ablation with surgery for the treatment of primary great saphenous varicose veins. *Br J Surg* 2008;95:294-301.
17. Akgül A, Polat A, Bakuy V, Özbalcı EA. Endovenöz varis tedavisi ve komplikasyonları. *Türkiye Klinikleri J Cardiovasc Surg-Special Topics* 2009;2:46-9.
18. Yalçın M, Gödekmerdan E, Tayfur KD, Koç A. Endovenöz ablasyon uygulanan 585 hastamızın erken ve orta dönem sonuçları. *Damar Cer Derg* 2016;25:24-30.
19. van Eekeren RR, Boersma D, Konijn V, de Vries JP, Reijnen MM. Postoperative pain and early quality of life after radiofrequency ablation and mechanochemical endovenous ablation of incompetent great saphenous veins. *J Vasc Surg* 2013;57:445-50.
20. Thompson R, Lewis A, Weir C. Patient-reported quality-of-life after radiofrequency ablation of varicose veins compared to conventional surgery. *Ir J Med Sci* 2013;182:639-42.
21. Kutlu A, Yılmaz E, Ceçen D, Eser E, Ozbakkaloglu A. The Turkish validity and reliability of the venous insufficiency epidemiological and economic study-quality of life/symptoms scales. *Angiology* 2011;62:329-37.
22. Kelechi T, Bonham PA. Lower extremity venous disorders: implications for nursing practice. *J Cardiovasc Nurs* 2008;23:132-43.
23. Altınsoy A. Yüzeysel venöz yetmezlikte endovenöz lazer ablasyon tedavisi: Kısa ve uzun dönem sonuçları. [Uzmanlık Tezi], Gaziantep: Gaziantep Üniversitesi Tıp Fakültesi Radyoloji Anabilim Dalı; 2011.
24. Beresford T, Smith JJ, Brown L, Greenhalgh RM, Davies AHA. Comparison of health-related quality of life of patients with primary and recurrent varicose veins. *American College of Phlebology* 2003;18:35-8.
25. Mallick R, Lal BK, Daugherty C. Relationship between patient-reported symptoms, limitations in daily activities, and psychological impact in varicose veins. *J Vasc Surg Venous Lymphat Disord* 2017;5:224-37.
26. Cotton SC, MacLennan G, Brittenden J, Prior M, Francis J. Behavioural recovery after treatment for varicose veins. *Br J Surg* 2016;103:374-81.
27. Siribumrungwong B, Noorit P, Wilasrusmee C, Teerawattananon Y, Thakkinstian A. Quality of life after great saphenous vein ablation in Thai patients with great saphenous vein reflux. *Asian J Surg* 2017;40:295-300.
28. Uncu H, Tor Ocak F, Karaca S, Badak TO, Özsöyler İ. Comparison of mid-term results of 980 nm wavelength endovenous laser ablation and radiofrequency ablation in varicose vein surgery. *Türk Gogus Kalp Dama* 2015;23:678-82.
29. Clark A, Harvey I, Fowkes FG. Epidemiology and risk factors for varicose veins among older people: cross-sectional population study in the UK. *Phlebology* 2010;25:236-40.
30. Lee AJ, Robertson LA, Boghossian SM, Allan PL, Ruckley CV, Fowkes FG, et al. Progression of varicose veins and chronic venous insufficiency in the general population in the Edinburgh Vein Study. *J Vasc Surg Venous Lymphat Disord* 2015;3:18-26.
31. Lee AJ, Evans CJ, Allan PL, Ruckley CV, Fowkes FG. Lifestyle factors and the risk of varicose veins: Edinburgh Vein Study. *J Clin Epidemiol* 2003;56:171-9.
32. Çeviker K, Şahinalp Ş, Çiçek E, Demir D, Uysal D, Yazkan R, et al. Quality of life in patients with chronic venous disease in Turkey: influence of different treatment modalities at 6-month follow-up. *Qual Life Res* 2016;25:1527-36.
33. Mishra S, Ali I, Singh G. A study of epidemiological factors and clinical profile of primary varicose veins. *Medical Journal* 2016;9:617-21.
34. Laurikka JO, Sisto T, Tarkka MR, Auvinen O, Hakama M. Risk indicators for varicose veins in forty- to sixty-year-olds in the Tampere varicose vein study. *World J Surg* 2002;26:648-51.
35. Allen L. Assessment and management of patients with varicose veins. *Nurs Stand* 2009;23:49-57.
36. Asbeutah AM, Al-Azemi M, Al-Sarhan S, Almajran A, Asfar SK. Changes in the diameter and valve closure time of leg veins in primigravida women during pregnancy. *J Vasc Surg Venous Lymphat Disord* 2015;3:147-53.
37. Joseph N, B A, Faizan Thouseef M, Devi M U, Abna A, Juneja I. A multicenter review of epidemiology and management of varicose veins for national guidance. *Ann Med Surg (Lond)* 2016;8:21-7.
38. Melo BV, Toja PGMD, Lea FJ, Couto RC. Quality of life in chronic venous patients who do or do not wear compressive stockings. *J Vasc Bras* 2015;14:62-7.
39. Baranski K, Chudek J. Factors affecting patients' self-management in chronic venous disorders: a single-center study. *Patient Prefer Adherence* 2016;10:1623-9.
40. Özdemir ÖC, Sevim S, Duygu E, Tuğral A, Bakar Y. The effects of short-term use of compression stockings on health related quality of life in patients with chronic venous insufficiency. *J Phys Ther Sci* 2016;28:1988-92.