EFFICACY AND RESULTS OF THERMOCOAGULATION MODALITY IN THE TREATMENT OF RETICULAR AND TELENGIECTASIC VEINS: MIDTERM AND LONGTERM RESULTS OF 5000 CASES.

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ABSTRACT

Background: Reticular and telengiectasic varicosities are one of the most common problems in the general population effecting predominantly females. They have higher prevalence in females between 20-70 years with a rate of 55%. Although these varicosities cause pain and feeling of tiredness, they mostly cause cosmetic problems in patients. Schlerotherapy is a gold standard threapeutical option for the treatment of reticular and telengiectasies over 0.3 mm. But for the ones smaller than 0.3 mm, there are other options such as thermocoagulation with radiofrequency and laser energy. The aim of this study is to evaluate the efficacy of thermocoagulation method for the treatment of reticular and telengiectasies.

Patients and Methods: Between April 2004 and February 2008 TC 3000 thermocoagulation device had been used in 5000 patients for the treatment of reticular and telengiectasic varicosities. The lesions were divided into four groups in accordance with the classification of telengiectasies as linear, spider, arborized and papillary. Groups contained 7853, 5123, 4122 and 2757 lesions respectively. 4753 of the patients were female and the mean age was 28. Mean follow-up time 24.2±11.9 months. Improvement findings of the lesions were evaluated in five improvement levels.

Results: Improvement levels in lineer telengiectasy group were 100%. But in more complicated spider, arborized telengiectasies and bluish-purple small reticular varicosities, this improvement ratio was approximately 75%. 40% of such cases needed second and 15% needed a third application of the thermocoagulation. The mean improvement level in all lesions was 4.3 after all the treatments. When the lesions were evaluated according to their localizations, efficacy of the treatment was higher at the lesions that located below the knee, ankle and feet when compared to the lesions located over the knee and the external thigh.

Conclusions: Thermocoagulation is an efficient and hope-giving transcutaneous method for the treatment of small reticular and telengiectasix varicosities that can not be treated effectively with microsclerosis.

Key words: Reticular veins, telengiectasies, thermocoagulation method.

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Introduction

Venous insufficiency is one of the most common chronic health problems that effect patients' quality of life, health economics and expenses. Recently CEAP (C: clinical, E: etiologic, A: Anatomic, P: Pathophysiologic) was adopted worldwide to facilitate meaningful communication about CVD and serve as a basis for more scientific analysis of management alternatives. This classification, based on correct diagnosis, was also expected to serve as a systematic guide in the daily clinical investigation of patients as an orderly documentation system and basis for decisions regarding appropriate treatment. According to this classification small reticular and telengiectasic varicosities belong to the C1 class.(1) This common health problem effects 15% of adult population and 55% of females between the ages of 20-70 years.(2,3) When compared to trunk varicosities, treatment of small reticular and telengiectasic varicosities is more complicated for both patients and the doctors and takes time. Although these type of lesions cause leg discomfort, pain and feeling of heaviness and tiredness in the leg, they mostly appear as a cosmetic problem in young ladies. (4) Therefore it is sometimes very demanding to satisfy the expectations of these group patients.

Due to these difficulties in the treatment of these lesions, lots of treatment options have been used so far. Schlerotherapy as a gold standard treatment measure in the treatment of reticular veins has its place almost more than 150 years. Since its first explanation by Chassaignac (5) in France in 1855, schlerotherapy maintained its popularity although the techniques and the drugs have been changed. Nowadays with the use of drugs with low adverse effect profile and 32 Gauge fine needles, it is now possible to treat small reticular and some telengiectasies. However it is very difficult or impossible to treat red telengiectasies in patients with contraindication to drugs (allergies) and patient with needle phobia. Therefore new treatments are always in search for these groups of patients.

Thermocoagulation (radiofrequency energy) method is one of the alternative modalities that have been in use for the treatment of small reticular and telengiectasic varicosities that can not be treated by schlerotherapy for more than 8 years. Main principle in thermocoagulation method is a thermal damage that has been formed by a 4 MHz radiofrequency wave. When it is applied on a given lesion, it causes a 70 °C temperature inside the treated vessel. As a result, plasma proteins are coagulated and parietal structures are destroyed. With this mechanism, the system is completely different from electrocoagulation. Thermocoagulation is a user-friendly, simple method and can be applied in large numbers according to the patient's and doctor's patience.

The aim of this study is to evaluate the efficacy of thermocoagulation method in small and telengiectasic varicosities.

Patients and Methods

Between April 2004 and February 2008, 5000 cases were treated by TC 3000 (Formes Et Performances, Bordeaux, France) (Picture 1) for small reticular and telengiectasic varicosities. 4753 of the patients were female and mean age was 28.3±15.9 years. All patients were informed before the procedure and written consents were taken. Patients were advised to have epilation of their legs prior to study. All of the lesions were mapped by taking picture before the treatment. Small reticuler veins (<0.3 mm) and telengiectasies were included to study. Patients with cardiac pacemakers, active infections in the area that will be treated, and pregnant patients were excluded. Totally 19885 lesions of 5000 cases were treated. These lesions were divided into four groups as Group 1 (linear-7853 lesions), Group 2 (spider-5123 lesions), Group 3 (arborized-4122 lesions) and Group 4 (papillary-2757 lesions). Recovery levels of each group were compared, after they were evaluated inside themselves. Lesions were also classified according to their localization: anterior thigh, medial thigh, lateral thigh, medial knee, lateral knee, calf, ankle, foot. Topical anesthetic cream (Lidocain 25 mg,

Prilocain 25 mg, Emla 5%, AstraZeneca) was applied prior to treatment in patient with low pain threshold. A clear topical antiseptic (Dermal Wound Cleanser, Smith&Nephew Inc., Largo, FL, USA) was used just before the treatment over the target areas. At the beginning of the series cold application was used with ice packs to provide topical anesthesia before the treatment, but soon we quitted this procedure. The reason for this was the disappearance of some lesions as a result of the cold induced vasoconstriction. Temperature and the lightning levels of the therapy room were kept optimum. The lesions were also vanished when the patient felt cold.

Thermocoagulation application technique:

TC 3000 (Formes Et Performances, Bordeaux, France) thermocogualation device has three parts: one console for radiofrequency energy generator, one isolated needle for applying energy to the lesion and one footswitch for synchronization between generator and the needle. Applied energy and the duration can be adjusted over the generator console (Picture 2).

Isolated needle has a very special design. Outer surface is totally isolated and only the tip part is conductive. With this design it gives the radiofrequency energy only the applied vessel and protects surrounding tissues (Picture 3).

This needle is made of nickel. But there are also golden needles for the patients who are allergic to nickel. According to the lesion diameter special different sized isolated needles from Ballet and FCare Systems brands were used ([Ballet brand: K3 0.075-0.080 mm, K5G (golden needle) 0.80-0.125 mm K6 0.150 mm], [FCare systems: R3i 0.08 mm, R6i 0.15mm]).

After the selection of the needle type according to the lesion, it is attached to the handle. Energy and the duration are adjusted. For telengiectasies that were treated with K3-K5G, R3i needles 20-30% energy level and duration of 0.2-0.3 second were used. For lesions bigger than 0.1 mm that were treated with K6, R6i 40-50% energy level and 0.4-0.5 second duration were used. For papillary lesions 60% energy level and 0.6 second adjustments were used.

Patients were positioned whether supine or prone according to the place of the treated lesion. In order to have better vision magnifying glasses were used. Needles were inserted perpendicularly over the lesion. After the seeing some vanishing of the lesion, energy is delivered by pressing on the footswitch (Picture 4). There should be 1-2 mm distances between each pulse of energy. Lesser or longer distances are not approved (Picture 5). Lesser distances may cause the prolongation of the recovery time, while longer distances may decrease the success rate. There is no need for compression stockings or bandages after the treatment.

Post-procedural care and follow-up:

Topical ice packs or cold shower were applied over the treated area. Patients were advised to continue to their daily social activities. There was no limitation for sun bath. Patients were seen on the second day of treatment and then weekly until the complete recovery of crusts. During follow period second or third treatments were performed for the residual lesions. Patients are followed yearly thereafter.

RESULTS

Lesion become flushed and swollen immediately after the RF therapy. These new lesions are called as oreols (Picture 6). One day later these oreols vanished and left their places to crusts (Picture 7). After a mean period of four weeks (1 to 8 weeks) these crust are peeled spontaneously and completely recovered (Picture 8).

In patients with skin phototype I and II after peeling of the crusts, a pale, white, slightly raised scatris of the crusts remained under the crusts. These lesions lasted 1-3 months and then completely resolved. Mean follow-up period was 24.2±11.9 months.

Patients were evaluated according to the 5 recovery levels:

Level 1: <25% recovery

Level 2: 25-50% recovery

Level 3: 50-75% recovery

Level 4: 75-90% recovery

Level 5: 90-100% recovery

Results of the recovery levels of the four types of lesions were detailed in figure 1.

Recovery level of the linear telengiectasies was 100%. But this level was 75% in more complicated and arborized lesions. Second (40%) and third (15%) interventions were needed in this group of patients. After additional interventions that were performed with 3-4 weeks intervals, mean recovery levels of the patients was 4.3. Lesions were also evaluated according to their locations. Recovery-levels of the lesions located below the knee parts, ankle and foots were better than the lesions located to over the knee parts especially lateral thigh parts. Recovery-levels according to the locations were summarized in figure 2.

There were no systemic or local procedure related complications in any of the patients. No ecchymosis, discoloration and inflammation were seen. In 22 patients golden needles were used due to metal allergies. No allergic reactions were seen in any of the patients due to procedure or needles.

Discussion

The most important factors that effect the treatment success in thermocoagulation method are selection of appropriate needle size, energy level and duration. By giving an example this situation can be understood more precisely. If you choose an inappropriate needle size (K6, R6i) for a <0.1 mm lesion, even you apply the energy just over the lesion correctly, since the needle size is bigger than the lesion, applied energy may cause damage the surrounding tissue. (13) In occasions just the opposite of the example (bigger lesion, small needle), insufficient

energy may cause treatment failure. Furthermore it is also of crucial importance to see the vanishing of the lesion before applying the energy even in combination of right needle size and energy. By this confirmation method, paravascular application of the energy is avoided. All this treatment optimization can be achieved by experience and meticulous application.

For lesions especially overpatellar and lateral thigh area, since these areas are prone to cellulitis and edema, target treatment success may not be reached. In order to increase success in these areas, second and third applications may be required.

Electrocoagulation, microsclerosis, laser energy and phototherapy are the other alternative treatment modalities to radiofrequency thermocoagulation in the treatment of reticular and telengiectasic veins. Microsclerosis is very well-known modalities and applied with a high success rates in lesions ≥0.3 mm by experienced hands from very long time. Currently microsclerosis is the gold standard therapy. However there is always complication risk related with the sclerosing agent, concentration, applied technique and lesion diameter. The thinnest needle size is 32 G and for the lesions that this needle size can be introduced, schlerotherapy should be the treatment of choice. (10) For residual lesions and lesion that can not be cannulated thermocoagulation method is good and effective alternative. Inadvertent events may be seen due to weak subcutaneous tissue and thin skin especially at the lesion located to ankle and the foot. Therefore it is better to use transdermal radiofrequency for these lesions.

Laser energy is another popular option that has been in use in any of the medical discipline for several reasons. It has been used in the treatment of varicose veins since 1980. The basic principle in the laser energy is absorption of the energy by chromophoric structures. Then heat is generated and contained in these tissue targets. The production of high temperatures within the targeted structure, combined with its rapid dissipation, enable exquisitely selective injury in microscopic tissue targets. Heat is dissipated by conduction and radiative transfer as soon as it is created. Selective target heating is produced when the energy is deposited at a rate

faster than the rate of cooling of the target structure. Different wavelengths (810 nm, 940 nm, 980 nm) have been approved by FDA for the treatment of varicosities.

In the 1980s, argon lasers were used, but the 488-nm wavelength was strongly absorbed by melanin. Also, argon lasers were continuous lasers that did not allow for selective heating of vessels, so scarring was common. In 1983, Anderson and Parrish's principles of selective photothermolysis guided the design of the pulsed dye laser (PDL), which successfully treated facial telangiectasias and port-wine stains. Although a 577-nm wavelength was originally chosen to match the yellow absorption peak of oxyhemoglobin, it was quickly realized that a 585-nm wavelength resulted in more effective treatment of portwine stains.

A second generation of PDLs with a longer wavelength (595 nm) and longer pulse duration (1.5 milliseconds) as released in 1996. These PDLs penetrated deeper but were still only effective for vessels up to 1 mm in depth and 1 mm in width. Over the past 5 years, near-infrared lasers targeting the broad absorption band from 750 to 1100 nm have been used to penetrate further. The longer wavelength alexandrite, diode, and Nd:YAG permit sufficient energy to heat deeper leg veins up to 3 mm wide. (11-14)

There is no standard method or algorithm for reticular and telengiectasies. It is also impossible to cure all types of lesions with one laser energy source. Its' usage in this type lesions is limited. Also it has some disadvantages such as need for sun-protection, limited use in dark skin color etc.

If we think that all lesion types of CEAP class (C0-C6) can be found in a patient's leg, in order to provide a complete treatment all treatment options must be in our treatment spectrum. And all of them must be used when they are indicated.

When compared with other treatment modalities RF energy is a user friendly option and has some advantages. It can be applied in all skin types, no need for sun protection, and does not

cause skin necrosis or pigmentation disorders. It can safely be used in the treatment of varicosities that can not be treated with microschlerotherapy.

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Figure 1: Recovery levels according to the lesion types.

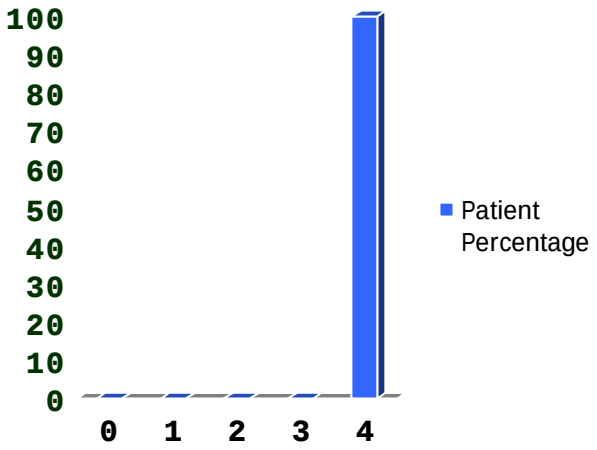
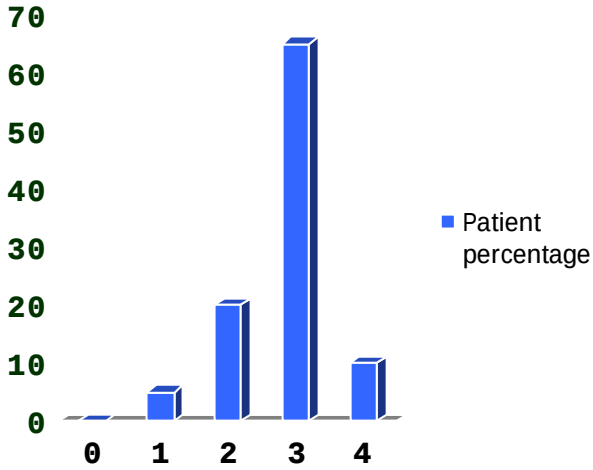
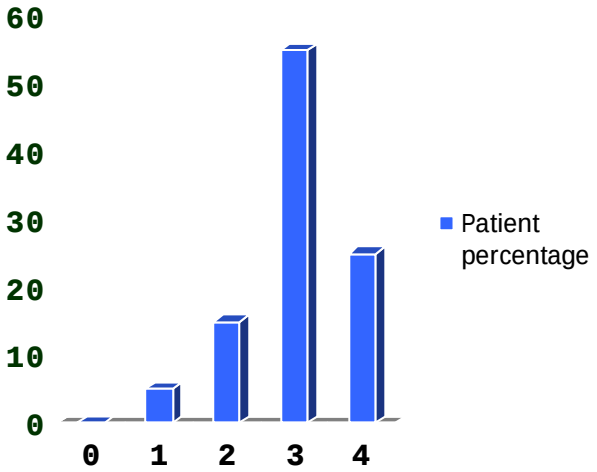


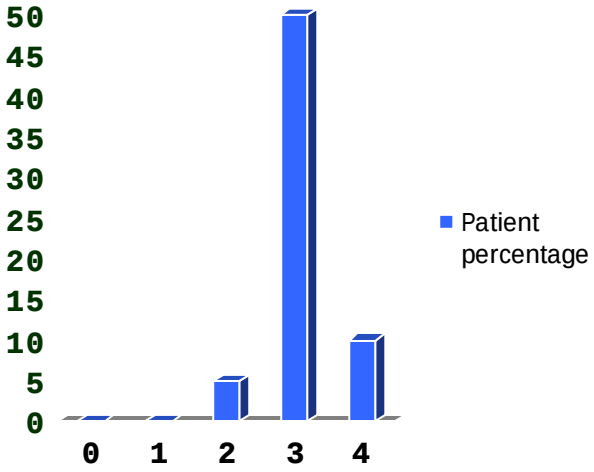
Figure 1a: Recovery level of linear lesions



Figür 1b: Recovery levels of spider lesions



Figür 1c: Recovery levels of spider lesions arborized lesions



Figür 1d: Recovery levels of papillary lesions

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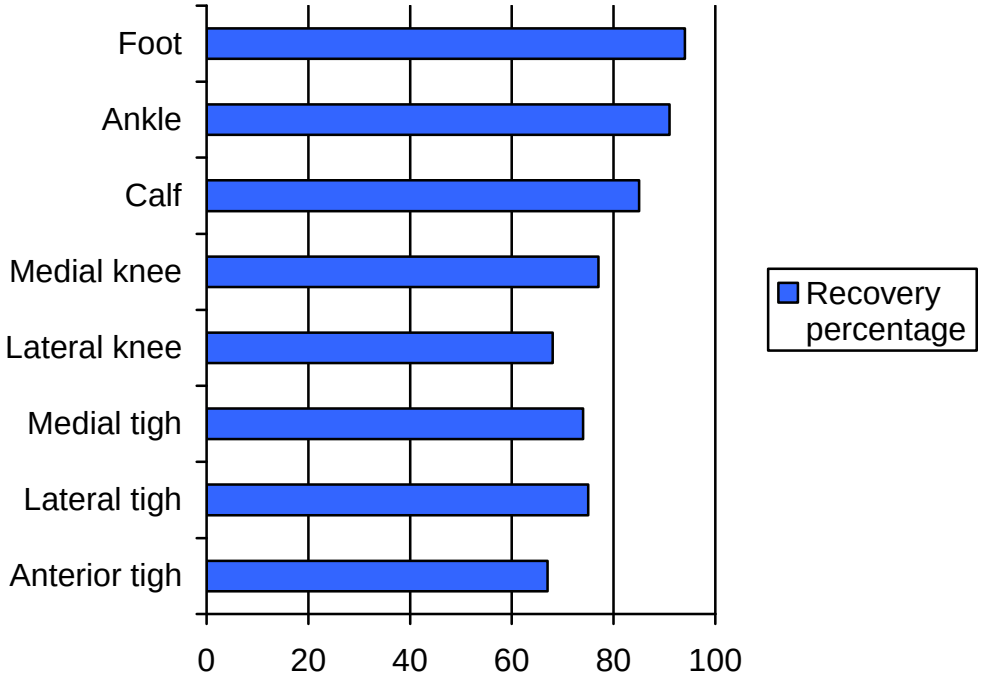
Figure 2: Recovery percentages of the lesions according to their localizations after the first treatment.



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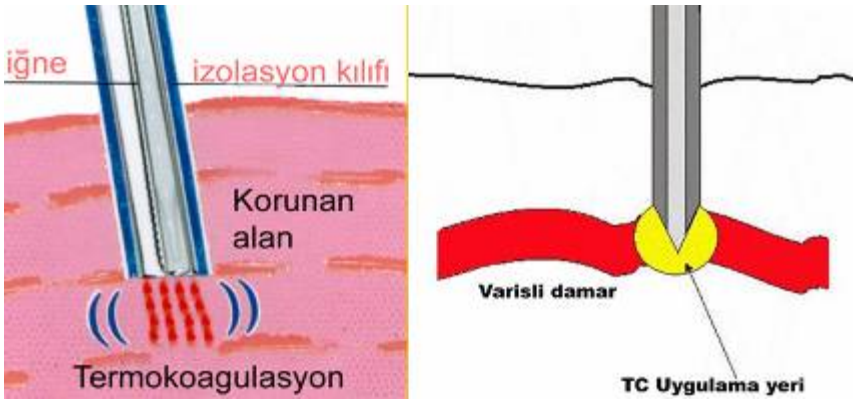
Picture 1: TC 300 thermocoagulation device

Picture 2: Adjusting the RF energy level and duration

Picture 3: Diagram showing special isolated kneedle and application



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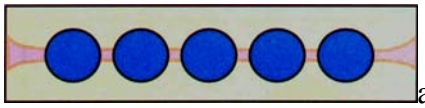
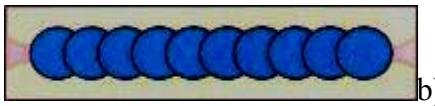
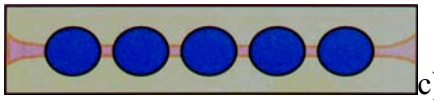
Picture 4: Thermocoagulation application method

Picture 5: Diagram showing the optimal spot interval


a) Normal


b) Very narrow spot


c) Very wide spot

Picture 6: Oreols

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Picture 7: Crusts following oreols

Picture 8: Healed lesion

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