



Mechano-Chemical Ablation versus Thermal Ablation as a Management Modality for Primary Great Saphenous Varicose Veins

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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List of Contents

Title	Page No.
List of Tables	5
List of Figures	7
List of Abbreviations.....	11
Introduction.....	- 1 -
Aim of the Work	16
Review of Literature	
▪ Anatomy, Physiology, Histology and Pathophysiology of Varicose Veins.....	17
▪ Endovenous Thermal Ablation (Endovenous Laser Ablation).....	47
▪ Endovenous Thermal Ablation (Radiofrequency Ablation).....	60
▪ Mechanochemical Ablation and Sclerotherapy	66
Patients and Methods	81
Results	107
Discussion.....	127
Conclusion	137
Summary	138
References	141
Arabic Summary	

List of Tables

Table No.	Title	Page No.
Table 1:	Indications for sclerotherapy according to the European guidelines	72
Table 2:	Absolute and relative contraindications for sclerotherapy according to the European guidelines	79
Table 3:	Sever and benign complications of sclerotherapy according to the European guidelines	80
Table 4:	Venous clinical severity score (VCSS)	85
Table 5:	Comparison between groups according to demographic data.	108
Table 6:	Comparison between groups according to comorbidity.	109
Table 7:	Comparison between groups according to length of GSV (cm).....	111
Table 8:	Comparison between groups according to CEAP.....	111
Table 9:	Comparison between groups according to diameter of GSV "mm" before procedure.....	112
Table 10:	Comparison between groups according to diameter of GSV "mm" after procedure.....	113
Table 11:	Comparison between groups according to difference between before and after procedure diameter of GSV "mm".	114
Table 12:	Comparison between before procedure and after procedure according to diameter of GSV "mm" in group I: MOCA (n=20).....	115

List of Tables cont...

Table No.	Title	Page No.
Table 13:	Comparison between before procedure and after procedure according to diameter of GSV "mm" in group IIa: EVLA (n=10).....	117
Table 14:	Comparison between before procedure and after procedure according to diameter of GSV "mm" in group IIb: RF (n=10).....	118
Table 15:	Comparison between groups according to compressibility of GSV after intervention.....	119
Table 16:	Comparison between groups according to operative time (min).	119
Table 17:	Comparison between groups according to compression post-operative (days).	121
Table 18:	Comparison between groups according to time to return to normal work (days).	122
Table 19:	Comparison between groups according to recanalization.	123
Table 20:	Comparison between groups according to adverse events.	124
Table 21:	Limbs (unilateral, bilateral).....	125
Table 22:	Comparison between VCSS pre and Post-operative in MOCA Treated group	125
Table 23:	Comparison between VCSS pre and Post-operative in EVLA Treated group.....	126
Table 24:	Comparison between VCSS pre and Post-operative in RFA Treated group	126

List of Figures

Fig. No.	Title	Page No.
Figure 1:	Transverse B-mode ultrasound image of the “Egyptian eye”.	20
Figure 2:	Relationship between the fascia and veins of lower extremity.	20
Figure 3:	Superficial and perforating veins of the leg	21
Figure 4:	Superficial and perforating veins of the foot and ankle.	21
Figure 5:	Deep veins of the leg.	24
Figure 6:	The small saphenous vein and lateral venous system of the calf.	24
Figure 7:	Deep veins of the foot and calf	25
Figure 8:	SFJ anatomy.	27
Figure 9:	Ultrasound recognition of the GSV on the left and the SSV on the right.	29
Figure 10:	The interfascial compartment in which GSV runs had been called ‘saphenous compartment’ and superficial fascia that covers it (continuous line), ‘saphenous fascia’	29
Figure 11:	Two veins were present at the (left) groin.	31
Figure 12:	The two veins may had their own separate ‘eye’.	32
Figure 13:	Only one vein was present here, but its position over deep vessels suggests it was AASV, while GSV was non-visible (hypoplastic).	32
Figure 14:	The vein inside the T-G angle was the great saphenous vein (GSV).	33
Figure 15:	If the T-G angle was empty, we can say that GSV was hypoplastic and that a tributary had prevailed.	34

List of Figures *cont...*

Fig. No.	Title	Page No.
Figure 16:	The vein wall was composed of an intima, media and adventitia.	40
Figure 17:	Normal venous drainage of lower limb.....	43
Figure 18:	Endovenous laser ablation equipment. (a) Laser generator and foot pedal. (b) Laser fibers.	59
Figure 19:	Example of different protection glasses. protective eyewear is required for every person in the procedure room while the laser is activated, including the operator, support staff, and patient.	59
Figure 20:	The ClosureFast™ radio-frequency catheter.	65
Figure 21:	Radio-frequency endovenous thermal ablation with the Closure Fast™ catheter.....	65
Figure 22:	Set of Flebogrif catheter.....	70
Figure 23:	The Tessari double syringe system (DSS) technique	76
Figure 24:	Device used.	88
Figure 25:	Left lower extremity prepped and draped in a sterile fashion for great saphenous venous thermal ablation.....	89
Figure 26:	Transverse ultrasound image demonstrating intravascular position of needle tip	89
Figure 27:	Longitudinal ultrasound image confirm intravascular position of the guidewire.....	90
Figure 28:	Removal of the guide wire.....	90
Figure 29:	Longitudinal ultrasound image showing the guidewire crossing the saphenofemoral junction and entering the deep venous system.	91

List of Figures *cont...*

Fig. No.	Title	Page No.
Figure 30:	The sheath is advanced into the GSV over the wire.....	91
Figure 31:	Laser tip fiber position.....	92
Figure 32:	(a) Transverse ultrasound images at the level of the distal thigh, (b) midthigh, and (c) proximal thigh after delivery of tumescent anesthesia.....	92
Figure 33:	Longitudinal ultrasound images of the proximal great saphenous vein (a) before and (b) after tumescent anesthesia.....	93
Figure 34:	Closure FAST catheter with RFG® generator.....	95
Figure 35:	Closure FAST Catheter.....	95
Figure 36:	Closure FAST Catheter.....	96
Figure 37:	Catheter Shaft Marking.....	96
Figure 38:	Cross-sectional ultrasound image demonstrating intraluminal placement of guidewire.	97
Figure 39:	Guidewire inserted into microsheath.....	97
Figure 40:	Measurement of the estimated sheath length.	98
Figure 41:	Flebogriff catheter set.	100
Figure 42:	Flushing of catheter set.	100
Figure 43:	Introduction of catheter through the vein.....	101
Figure 44:	Catheter reaching SFJ.....	101
Figure 45:	Opening of the catheter.....	102
Figure 46:	Catheter tip 2cm distal to SFJ.....	102
Figure 47:	Tessari method.	103
Figure 48:	Injection of foam through the catheter.....	103

List of Figures *cont...*

Fig. No.	Title	Page No.
Figure 49:	Catheter while moving through the vein.	104
Figure 50:	Removal of the catheter.	104
Figure 51:	Bar chart between groups according to comorbidity.	109
Figure 52:	Bar chart between groups according to diameter of GSV "mm" before procedure.....	112
Figure 53:	Bar chart between groups according to diameter of GSV "mm" after procedure.....	113
Figure 54:	Bar chart to compare groups according to difference between before and after procedure diameter of GSV "mm".....	114
Figure 55:	Comparison between before procedure and after procedure according to diameter of GSV "mm" in group I: MOCA (n=20).	116
Figure 56:	Comparison between before procedure and after procedure according to diameter of GSV "mm" in group IIa: EVLA (n=10).	117
Figure 57:	Comparison between before procedure and after procedure according to diameter of GSV "mm" in group IIb: RF (n=10).	118
Figure 58:	Bar chart comparison between groups according to compression post-operative (days).....	121
Figure 59:	Bar chart comparison between groups according to time to return to normal work (days).....	122
Figure 60:	Bar chart comparison between groups according to recanalization.	123
Figure 61:	Bar chart comparison between groups according to adverse events.	124

List of Abbreviations

Abb.	Full term
AASV	<i>Anterior Accessory Saphenous Vein</i>
AC	<i>Alternating current</i>
CEAP	<i>Clinical, etiological, anatomical &pathophysiological</i>
CFV.....	<i>Common femoral vein</i>
CVI.....	<i>Chronic venous insufficiency</i>
DC	<i>Direct current</i>
DVT.....	<i>Deep venous insufficiency</i>
EHIT	<i>Endovenous heat induced thrombosis</i>
EVLA	<i>Endovenous laser ablation</i>
EVTA	<i>Endovenous thermal ablation</i>
GSV.....	<i>Great saphenous vein</i>
LEED	<i>Linear Endovenous energy density</i>
MOCA.....	<i>Mechanochemical ablation</i>
PVs.....	<i>Perforating veins</i>
RF	<i>Radiofrequency</i>
RFA.....	<i>Radiofrequency ablation</i>
SFJ	<i>Saphenofemoral junction</i>
SPJ	<i>Saphenopopliteal junction</i>
SSV.....	<i>Small saphenous vein</i>
VCSS	<i>Venous clinical severity score</i>
VV.....	<i>Varicose veins</i>

INTRODUCTION

Chronic venous insufficiency (CVI) is one of the most common conditions in the world. The World Health Organization defines varicose veins (VV) of the lower limbs as dilated superficial veins presented as baggy or cylindrical in shape veins and possessing damaged valves. In 70% of cases saphenous veins are affected. ⁽¹⁾

It is reported that 40–60% of women and 25–30% of men will present with symptoms of venous insufficiency during lifetime. ⁽²⁾

Major risk factors include age and family history for both genders. Pregnancy is an additional risk factor along with standing for long periods, obesity and female gender. ⁽³⁾

The severity of symptoms of VV can range from occasional discomfort and itching to severe skin ulceration, absence from work, pain and decline in quality of life. About 10% of patients with VV develop skin changes, such as pigmentation or eczema, and about 3% may develop venous ulcers. ⁽⁴⁾

The clinical signs and symptoms of venous disease may be classified using the CEAP (Clinical status, Etiology, Anatomy, and Pathophysiology) classification. The degree of severity of pain and other clinical signs or symptoms can be measured using the Venous Clinical Severity Score (VCSS);

the change of VCSS before and after the intervention can be used to measure the efficacy of the intervention. ⁽⁵⁾

Primary VV are mostly caused by the failure of at least single valve in a critical location, while secondary varicose veins occur when Deep Vein Thrombosis (DVT) causes deep system and valve damage. In primary VV, the retrograde venous inflow (reflux) allows high-pressure, blood to pass into unsupported superficial veins. These veins become dilated, tortuous, and incompetent. Untreated venous hypertension has significant morbidity. ⁽⁶⁾

Venous duplex imaging is the favored technique for evaluation of CVI to confirm the diagnosis and assess its etiology and anatomy. Reversal of flow in the superficial venous system lasting more than 0.5 second indicates valvular incompetence. Deep system reflux is considered abnormal when reversal of flow exceeds 1 second. Longer durations of reflux and higher reflux velocities and volumes have been used to assess the severity of reflux. ⁽⁷⁾

The management of varicose veins has changed drastically over recent years, but the ideal treatment remains elusive. Invasive treatments include traditional open surgery and minimally invasive endovenous ablation. The new treatments for varicose veins developed in the last few decades and primarily focused on ablation of the saphenous trunk. ⁽⁸⁾

Conventional open surgical management of great saphenous veins (GSV) varicosities consists of high sapheno-femoral (SFJ) ligation and stripping of the GSV. Recurrence remains a significant problem of open surgery recurrence rates are reported to be up to 20% at two years, 28% at five years. ⁽⁹⁾

Endovenous therapy, a minimally invasive procedure, offers potential benefits as faster recovery, reduced complications, fewer physical limitations, and improved health-related quality of life. It can be classified into thermal techniques and non-thermal techniques. Thermal ablation includes Endovenous Laser Ablation (EVLA), Radiofrequency Ablation (RFA), and steam vein sclerosis. Non-thermal ablation includes foam sclerotherapy, Mechanochemical Ablation (MOCA), and injection of cyanoacrylate glue. ⁽¹⁰⁾

EVLA induces a permanent, non-thrombotic occlusion of a refluxing vein using intraluminal application of laser energy. The laser energy induces mural inflammation and fibrosis with resultant vein obliteration. It could be performed as an outpatient procedure using tumescent anesthesia.⁽¹¹⁾ Duplex ultrasound examination at 5 years follow up after EVLA versus open conventional surgery showed recurrence rate of 6.7% vs 20.3% respectively. ⁽¹²⁾

RFA works in a similar mechanism in comparison to EVLA. Follow-up after five years showed durable and high occlusion rates of 91.9 %, with 94.9 % free of reflux. ⁽¹³⁾

Because of EVLA & RFA favorable side effect profile in conjunction to sustained efficacy, in many countries they already replaced high ligation and stripping in treatment of refluxing GSV as well as for treatment of perforators and selected tributaries. ⁽¹⁴⁾

Non-thermal, non-tumescent ablation of saphenous veins is another method for management of VV. MOCA is catheter based systems which strip-off the endothelium of the vein using a rotating wire at its tip while liquid sclerosant is administered concomitantly. ⁽¹⁵⁾

Mechanochemical truncal ablation offers patients reduced intra-procedural pain with equivalent technical success compared to radiofrequency truncal ablation at six months. Patients have equivalent disease specific quality of life and clinical outcomes, and returned to work and normal activities at similar times. ⁽¹⁶⁾