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

Thesis

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List of Abbreviations

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

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]