Autologous Platelet-rich Plasma Versus Conventional Dressing in Treatment of Chronic Venous Leg Ulcers

Thesis

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Ahmad Farid

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List of Abbreviations

Abb.	Full term
4LB	Four layer bandage
ABPI	Ankle Brachial Index
DUS	Duplex ultrasonography
AVF	American Venous Forum
AVPP	Arcus venosus plantaris profundus
CT	Compression Therapy
CTV	Computed tomographic venography
CVD	Chronic venous diseases
CVI	Chronic venous insufficiency
CVS	Confluens venosus subinguinalis
DVT	Deep Vein Thrombosis
EC	Endothelial cell
ECM	Extracellular matrix
ELAM-1	Endothelial leukocyte adhesion molecule-1
FOXC2	Forkhead box protein C2 gene
GAG	Glycosaminoglycan
GSV	Great saphenous vein
HFE	Hemochromatosis gene
HS	Hiatus saphenus
HTN	Hypertension
ICAM-1	Intercellular adhesion molecule-1
IL-1	Interleukin-1
LI	Ligamentum inguinale
li	Ligamentum inguinale
MC	Mast cells
MCP-1	Monocyte chemotactic protein-1
MIP-1b	Macrophage inflammatory protein-1b
MP	Macrophages
MPFF	Micronized purified flavonoid fraction

List of Abbreviations Cont...

Abb.	Full term
MRV	Magnetic resonance venography
MTS	MayeThurner syndrome
NO	Nitric oxide
PGI2	Prostacyclin
PRP	Platelet-rich plasma
PTA	Percutaneous transluminal angioplasty
SEPS	Subfascial endoscopic perforator surgery
SFJ	Saphenofemoral junction
SSB	Short stretch bandage
SSV	Small saphenous vein
TE	Thigh extension
TGF-b1	Transforming growth factor b1
TL	T lymphocytes
TNF-a	tumor necrosis factor-a
TRPV-1	Transient receptor potential vanilloid channels
VCAM-1	Vascular cell adhesion molecule-1
VCI	Vena cava inferior
VCIS	Vena circumflexa ilium superficialis
VES	Vena epigastrica superficialis
VF	Vena femoralis
VFC	Vena femoralis communis
VIC	Vena iliaca communis
VIE	Vena iliaca externa
VII	Vena iliaca interna
vis	Valvula infrasaphenica
VLUs	Venous leg ulcers
vp	Valvula preterminalis;
VP	Vena poplitea

List of Abbreviations Cont...

Abb.	Full term
VPES	Vena pudenda externa superficialis
VPF	Vena profunda femoris
VSM	Vena saphena magna
VSMAA	Vena saphena magna accessoria anterior
VSP	Vena saphena parva
vss	Valvula suprasaphenica
vt	Valvula terminalis
VvDP	Venae dorsales pedis
VvDPD	Venae diigtales profundae dorsales
VvF	Venae fibulares
VvMPD	Venae metatarsales profundae dorsales
VvTA	Venae tibiales anteriores
VvTP	Venae tibiales posteriors

INTRODUCTION

Venous leg ulcers (VLUs) are an important medical problem. The chronic and recurrent nature of VLUs causes morbidity, severely reduces quality of life, and increases the cost of health care. Venous leg ulcers account for approximately 70% of all leg ulcers and affect 2.2 million Americans annually ***(Alavi et al., 2016).***

There are two forces that make blood return to the heart possible which are: active calf muscle contraction (augmented by ankle movement) and the reactive closing of the venous valves. These two forces work in concert to propel venous return and prevent retrograde blood flow. A defect in any component of these two pathways can lead to chronic venous insufficiency (CVI) that ends by development of venous leg ulcers ***(Nelson and Harrison, 2014).***

Management of VLUs include many modalities to obtain good result and improving patients life-style, these modalities include compression therapy, medical treatment, surgical and interventional procedures and local wound care ***(Nelson and Harrison, 2014).***

Compression therapy is the mainstay of treatment for patients with venous leg ulcers and can be provided by three different techniques: bandage systems, stockings/ hosiery, or intermittent compression devices ***(Morton and Phillips, 2012).***

The physiologic effects of compression include accelerating venous flow, reducing venous reflux and edema, promoting oxygenation in the surrounding dermal skin tissue, and eventually stimulating fibrinolysis.

Patients with CVI are commonly found to have enlarged perforator veins with incompetent valves that allow reversal of flow from the deep venous system into the superficial system. The increased pressure transmitted into the superficial system contributes to inflammation and ulceration ***(Kirsner et al., 2013).***

Subfascial endoscopic perforator surgery (SEPS), a surgical technique to correct incompetent perforators, has been successful in multiple studies ***(Ashby et al., 2014).***

In recent years, percutaneous methods to ablate incompetent perforators using laser or radiofrequency energy have emerged and have generally replaced SEPS in many venous practices ***(Ashby et al., 2014).***

Percutaneous methods have the advantage of performance under local anesthesia with minimal morbidity.

Success rates have been reported at 60% to 80% for an individual procedure, with 90% of perforators closed with multiple attempts. Early reports suggest benefit in improving ulcer healing ***(Kirsner and Margolis, 2014).***

Minimally invasive surgeries, such as superficial venous sclerotherapy or ablation, have been used in the management of patients with VLUs. Less invasive methods improve healing of VLUs with isolated superficial incompetence ***(Woo et al., 2013).***

VLUs were treated with ultrasound-guided foam sclerotherapy combined with compression therapy. Combined therapy led to 81% healing at 6 months and 5% recurrence at 2 years ***(Katzel et al., 2014).***

Patients with recalcitrant VLUs may present with compression of the iliac venous system or vena cava called MayeThurner syndrome (MTS).

Obstruction of the venous outflow tract results in increased venous pressure, particularly with ambulation. This obstruction is a primary cause of poor adherence to compression therapy. Ambulation in a patient with MTS results in limb engorgement, leading to pain in the leg being treated with high-strength compression ***(Alavi et al., 2016).***

Percutanous stenting of the obstructed vein results in improved venous drainage, reduced limb edema, and pain alleviation.

Debridement is integral to wound care by removing devitalized tissue, foreign material, abnormal and dysfunctional cells, bacteria, and their byproducts, including biofilms ***(Wu et al., 2012).***