New Trends in the Treatment of Venous Diseases

Essay

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By

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Abstract

The advances in venous imaging allowed better understanding of venous disease.

Surgery remained the gold standard for treatment of varicose veins with sapheno-femoral incompetence and great saphenous vein reflux for decades.

The demand for smaller scars, fewer complications and faster return to work has inspired a number of new treatment options for varicose veins.

One of the most exciting areas of venous disease treatment is the ablation technique, instead of removing the great or short saphenous vein. A radiofrequency device is used to obliterate the vein, accomplished by generating heat through high frequency that is delivered by a small catheter, which destroys the endothelium of the vein. Another effective means of obliteration the saphenous vein is the endo-venous LASER treatment and achieved via heat generated from a LASER tip, mounted on a catheter, which destroys the endothelium of the vein. Foam sclerotherapy involves destruction of the inner wall of the vein by injection of sclerosing agents and causes its lumen to obliterate**.**

The current standard of care for deep venous thrombosis (DVT) is anticoagulation.

A new strategy for the design of new anticoagulant drugs is based on selective inhibition of a specific coagulation factor. These include direct thrombin inhibitors and factor Xa inhibitors

Percutaneous mechanical thrombectomy (PMT) with adjunctive thrombolytic therapy is a minimally invasive, low-risk therapeutic option in patients with extensive DVT, associated with clinical benefits including thrombus removal, patency, and relief of symptoms

Key Word:

- venous disease.
- Radiofrequency.
- endo-venous LASER treatment.
- Foam sclerotherapy.

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List of figures and tables

List of abbreviations

(AMI) Acute myocardial infarction

(aPTT) Activated partial thromboplastin time

(AVF) Arteriovenous fistula

(CDT) Catheter directed thrombolysis

(CHF) Congestive heart failure

(CVI) Chronic venous insufficiency

(DVT) Deep vein thrombosis

(EVLT) Endovenous laser therapy

(FDA) US Food and Drug Administration

(FST) Foam sclerotherapy

(GSV) Great saphenous vein

(HIT) Heparin-induced thrombocytopenia

(ICU) Intensive care unit

(IFVT) Iliofemoral DVT

(INR) International normalized ratio

(IVC) Inferior vena cava

(IVUS) Intra vascular ultrasound

(LMWH) Low-molecular-weight-heparin

(MRI) Magnetic resonance imaging

(PE) Pulmonary embolism

(PMT) Percutaneous mechanical thrombectomy

(RFA) Radiofrequency ablation

(RFG) Radiofrequency generator

(rtPA) Recombinant tissue plasminogen activator

(SEPS procedure) Subfascial endoscopic perforator ligation

(SFJ) Sapheno-femoral junction

(SLE) Systemic lupus erythematosus

(SPJ) Sapheno-popliteal junction

(SSV) Small saphenous vein

(UFH) Unfractionated heparin

(UK) Urokinase

(VTE) Venous thromboembolism

(VTF) The Vena Tech Filter

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Introduction

New Trends in the Treatment of Venous Diseases

The natural history of venous disease has received increased attention as our understanding and imaging capabilities of venous system have developed over the past three decades (**Jamshidi et al; 2005).** Lower extremity venous insufficiency is a common medical condition that affects approximately 25% of women and 15% of men (**Kundu 2007).**

Varicose veins are the most common venous disorder. Great saphenous vein (GSV) reflux is the underlying cause of most symptomatic cases. They produce discomfort, ache, cramp, itching, and cosmetic distress; they may be complicated by phlebitis, eczema, and/or ulceration (**Large 1986).** Conventional varicose vein surgery consists mainly of high ligation of the vessel and its tributaries at the level of the sapheno-femoral junction (SFJ) and stripping of the incompetent part of the GSV. This was widely accepted as standard therapy for saphenous vein insufficiency **(Rass 2005).**

In the recent years, new trends of treatment for varicose veins have started to become popular .The main aim of all new intervention is to reduce trauma to the patient and hasten full recovery, avoid general anesthesia, avoid groin incisions, and thigh hematomas (**Campbell 2007).**

One of the most exciting areas of venous disease treatment is the ablation technique, instead of removing the great or short saphenous vein. A radiofrequency device is used to obliterate the vein, accomplished by generating heat through high frequency that is delivered by a small catheter, which destroys the endothelium of the vein. Another effective means of obliteration the saphenous vein is the endo-venous LASER treatment and

achieved via heat generated from a LASER tip, mounted on a catheter, which destroys the endothelium of the vein. Foam sclerotherapy involves destruction of the inner wall of the vein by injection of sclerosing agents and causes its lumen to obliterate (**Pfeifere et al; 2005).**

Incompetence of perforator veins has been implicated in the pathogenesis of venous ulcerations. In **1938 Linton** described an operation that included perforating vein interruption and was even modified as late as 1953.The procedure featured a long medial calf incision, which was carried through the fascia to expose and interrupt all posterior, medial, and para-tibial perforators. The use of endoscopes in perforator vein interruption was begun in the mid-1980s. This offered a mean of visualization and ligation of the vein without long incisions of the skin **(TenBrook et al; 2004).**

The incidence of deep vein thrombosis (DVT) is approximately 80 per 100,000 persons per year in large community-based studies **(Stein et al; 2006).**

Deep venous thrombosis remains a significant source of morbidity and mortality, which affects not only patients who have undergone surgical and orthopedic procedures , but also those patients affected with cardiac , oncologic, traumatic, neurologic, gynecologic, and hematologic disorders as well as the geriatric population. Prevention of DVT allows patients to avoid the morbidity of chronic sequelae of DVT, such as chronic venous insufficiency and recurrent DVT, as well as acute consequences of pulmonary embolism (**Wakefield et al; 2000).**

The current standard of care for deep venous thrombosis (DVT) is anticoagulation. Traditional anticoagulant drugs, including unfractionated heparin and warfarin, have several limitations and in some clinical situations

they are contraindicated or inadequate, so there is still a need for a new anticoagulant drugs (**Bush et al; 2004).**

A new strategy for the design of new anticoagulant drugs is based on selective inhibition of a specific coagulation factor. These include direct thrombin inhibitors and factor Xa inhibitors **(Bauer 2006).** In some situations when anticoagulants are contraindicated or pulmonary embolism occurred in spite of adequate anticoagulation, vena caval filters are used to prevent pulmonary embolism (**Garrett et al; 2005).**

Percutaneous mechanical thrombectomy (PMT) with adjunctive thrombolytic therapy is a minimally invasive, low-risk therapeutic option in patients with extensive DVT, associated with clinical benefits including thrombus removal, patency, and relief of symptoms **(Arko et al; 2007).**
Endovascular treatment of venous occlusive disease is a safe and efficient minimally invasive technique with good mid-term patency rates. Moreover, it improves cases with obstruction only, as well as cases with associated reflux and obstruction. Primary stenting is sometimes required using self-expanding stents **(Hartung et al; 2005).**

Aim of the work:

Recently treatment of venous diseases is rapidly developing. The minimally invasive procedures will receive more and more attention, and progress in this area is expected. The main aim of all new interventions is to reduce trauma, hasten full recovery, and reduce the incidence of complications of traditional treatment. This essay will review the current medical and surgical treatment options in the treatment of venous disorders. The new trends in the

management of venous disorders will be investigated, highlighting the minimally invasive procedures, discussing the techniques, indications, contraindications, complications, advantages and disadvantages of each. Innovations in anticoagulant drugs as well as other medications will be reviewed including mechanism of action, advantages and side effects.

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Anatomy of the Venous System