Thrombolytic Therapy Of Acute Deep Venous Thrombosis Of The Lower Limb

An Overview

Essay
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APSAC	Anisoylated purified streptokinase activator complex
aPTT	Activated partial thromboplastin time
CDT	Catheter-directed thrombolysis
DVT	Deep vein thrombosis
FDA	Food and drug administration
INR	International normalized ratio
IVC	Inferior vena cava
LMWH	Low molecular weight heparin
MI	Myocardial infarction
PE	Pulmonary embolism
PTS	Post-thrombotic syndrome
SK	Streptokinase
t-PA	Tissue plasminogen activator
UFH	Unfractionated heparin
UK	Urokinase
VTE	Venous thromboembolism

Introduction

Deep venous thrombosis (DVT) and its potentially lethal acute complications like pulmonary embolism (PE) are extremely important clinical entities, which cause significant morbidity and mortality. It is believed that venous thromboembolism (VTE) is the most common cause of preventable hospital death (***Nutescu, 2007).***

Deep venous thrombosis most frequently affects the deep veins of the lower extremity. It usually begins in the calf veins. In patients found to have DVT on investigation, 33% have proximal (popliteal and above) vein involvement which has an increased risk of pulmonary embolism ***(Anaya and Nathens,2005).***

The pathology of DVT has been studied since the 19th century and is based on the seminal work of Virchow. Stasis, hypercoagulability, and endothelial damage have long been considered the underlying etiologies. It is rational to relate this pathogenesis to the increased risk of VTE associated with immobility, major trauma, the thrombophilia associated with various hematologic disorders and which can be detected in up to 50% or patients with a spontaneous DVT ***(Kyrle and Eichinger,2005). .***

The therapeutic goals for treating the patient with acute DVT include prevention of pulmonary embolism, prevention of recurrent thrombosis and preservation of venous valve function. Success in the achievement of these clinical goals will minimize the morbidity and mortality of PE and will diminish the long term sequels of the post thrombotic syndrome (PTS) ***(Johmson et al.,2004).***

Current conventional treatment of DVT consists of anticoagulation and the use of compression stockings.Anticoagulation therapy consists of subcutaneous low molecular weight heparin (LMWH) or intravenous heparin initially, followed by oral anticoagulants ***(Mismetti et al., 2001).***

Non conventional thrombo ablative types of therapy in acute DVT include systemic thrombolytic therapy, catheter directed regional thrombolytic therapy (CDT) and percutaneous mechanical thrombectomy have been proposed as a new treatment for patient with DVT. Application of these techniques could potentially result in lowering of post thrombotic syndrome by preservation of the venous valve function ***(Janssen et al., 2003).***

Thrombolytic agents are classified into three groups according to their mechanism of action:

1- Plasminogen activators : streptokinase (SK) and urokinase (UK).

2- Proteolytic enzymes : plasmin and brinase .

3-Fibrin-specific activators : tissue plasminogen activator (t-PA), single chain urokinase and anisoylated purified streptokinase activator complex (APSAC). ***(Kakker et al., 2004).***

Local regional thrombolytic therapy has emerged in the past decade as a possible superior approach allowing delivery of the thrombolytic agent directly into the venous thrombus. This technique has evolved to address the main limitations of systemic thrombolysis ***(Janssen et al., 2003).***

Aim of the work

The aim of this work is to study thrombolytic therapy of acute deep venous thrombosis of the lower limb as regard its efficacy, safety and complications.

Anatomy of the venous system of the lower limb

The venous system of the lower limb is divided into three groups:

A-Superficial system, which lies outside the deep fascia.

B-Deep system, which lies within the deep fascia.

C-Perforating system, which passes through the deep fascia and connects the deep and superficial system ***(Michael, 2002).***

About 10 – 15 of the venous drainage of the lower limb is carried by the superficial veins while the deep veins carry out the rest ***(Alimi et. al., 1994).***

A-The superficial venous system of the lower limb

1) The long or the great saphenous vein: (Internal or Saphena magna).

Of greatest concern to the physician treating venous diseases in the lower extremity is the great saphenous vein. The term saphenous is derived from the Greek word for "visible" ***(Williams, 2005).***

The long saphenous vein is the longest vein in the body. It is formed by the union of veins from the inner part of the foot and the medial marginal vein and runs upwards for 1 to 1.5 inches in front of the medial malleolus of the tibia ***(Decker et. al., 1996).***

It extends obliquely backwards over the subcutaneous medial surface of the lower fourth of the tibia and along the medial border of this to the medial condyle of the femur and over the posteromedial aspect of the knee, from here it climbs slightly forwards upon the anteromedial aspect of the thigh to join the common femoral vein at the groin as in figure (1) ***(Dodd and Cockett, 1996).***

Terminal tributaries:

Just below the sapheno-femoral junction, the great saphenous vein receives several additional tributary veins, including the lateral and medial femoral cutaneous veins, the internal pudendal vein, the superficial circumflex iliac vein and the superficial epigastric vein ***(Robert et. al ., 2004).***

2) The short saphenous: (external, small or lesser saphenous vein).

It begins along the lateral side of the dorsum of the foot as a continuation of the dorsal venous arch then it passes upward behind lateral malleolus, along lateral border of tendo-calcaneus ***(Henry, 2004).***

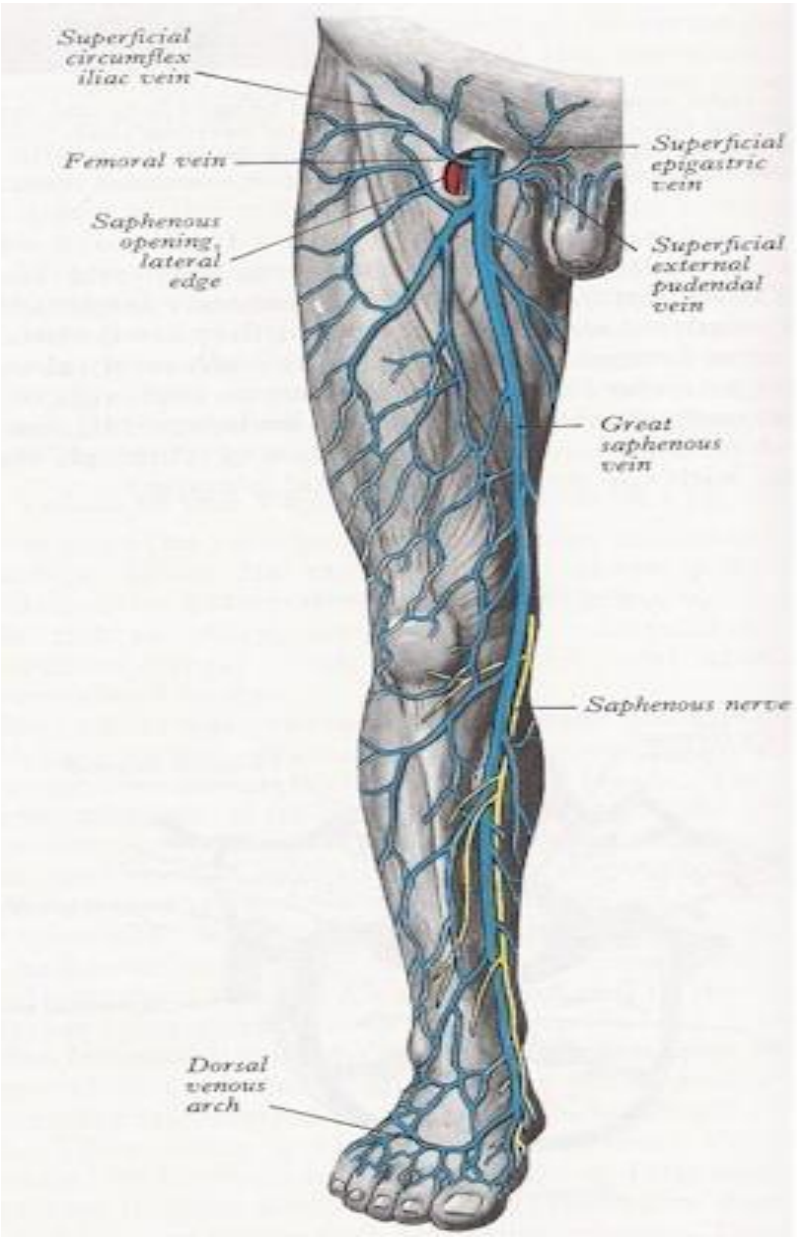

Figure (1): Anatomy of the great saphenous vein ***(Gray, 2005).***

In the foot and lower part of the calf it is accompanied by the sural nerve. At the popliteal fossa it typically passes between the

two heads of the gasterocnemius and empties into the popliteal vein as in figure (2) ***(Henry, 2004).***

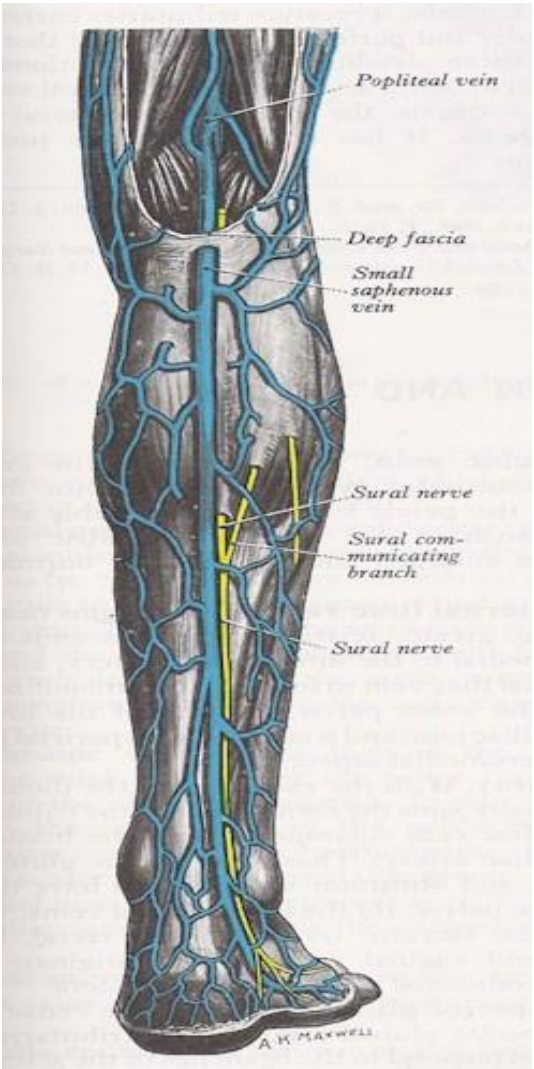

Figure (2)*:* Anatomy of the short saphenous vein **(*Gray, 2005).***