

# Recent Trends in the Management of Deep Venous Thrombosis in Cancer Patients

#### Essay

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#### By

#### **Khaled Waheeb Mohamed Behairy**

M.B.B.ch.

Under Supervision of

#### Prof. Dr/ Ahmed Alaa Eldin Salman

Professor of General Surgery Faculty of Medicine - Ain Shams University

#### Dr/ Ahmed Aly Khalil

Lecturer of General Surgery Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
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# Aeknowledgment (

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#### List of Abbreviations

**ACCP**: American College of Chest Physicians

**AIOM**: Italian association of medical oncology

**AIS**: Ischemic stroke

**APL** : Autoimmune phenomena lupus

**APTT**: Partial thromboplastin time

**aPTT** : Activated partial thromboplastin time

**ASCO**: American Society of Clinical Oncolog

**BMI** : Body mass index

**CDT** : Catheter-directed thrombolytic therapy

**c-MET** : MET proto-oncogene

**CP** : Cancer procoagulant

**CVC** : Central venous catheter

**DVT** : Deep vein thrombosis

**EC** : Endothelial cells

**EMS** : Electrical muscle stimulation

**EP** : E-series prostaglandin receptors

#### E List of Aberrations &

**ESAs** : Erythropoiesis-stimulating agents

**ESMO**: European Society of Medical Oncology

**FDA** : Food and Drug Administration

**GCS** : Graduated compression stockings

**HCC**: Hepatocellular carcinoma

**HGF**: Hepatocyte growth factor

**HIT** : Heparin-induced thrombocytopenia

**INCa** : Institut National du Cancer

**INR** : International normalised ratio

**IPC** : Intermittent pneumatic compression

**ISTH** : Society Thrombosis and Haemostasis

**IVC** : Inferior vena cava

LMW : Low molecular weight

**LMWH**: Low molecular weight Heparin

MI : Myocardial infarction

**MR** : Magnetic resonance

**MRA** : Magnetic resonance angiography

#### E List of Aberrations &

**NCCN**: National Cancer Comprehensive Network

**NOACs**: New oral anticoagulants

**PAR-1**: Protease-activated receptors

**PE** : Pulmonary embolism

**PGE2** : Prostaglandin E2

**PNH** : Paroxysmal nocturnal haemoglobinuria

**PS**: Platelet phosphatidylserine

**PT** : Prothrombin time

**PTS** : Post-thrombotic syndrome

**QoL** : Quality of life

**TF**: Tissue factor

**TFMP**: TF-bearing microparticles

**TFPI**: Tissue factory pathway inhibitor

**t-PA** : Tissue-type plasminogen activator

**UFH** : Unfractionated heparin

**u-PA** : Urokinase-type plasminogen activator

V/Q : Ventilation-perfusion

#### 🕏 List of Aberrations 🗷

**VEGFR**: Factor receptor

**VKA**: Vitamin K antagonist

**VTE** : Venous thromboembolism

**ZPI** : Protein Z-protein Z dependent protease

inhibitor

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#### Introduction

The association between cancer and thrombosis has been known since at least the 19th century. Cancer-associated venous thromboembolism (VTE) has significant clinical consequences for patients. Thrombo embolism is a leading cause of death in cancer patients and cancer patients who develop VTE have a significantly worse survival (*Alok A. Khorana et al.*, 2007).

Venous manifestations of cancer-associated thrombosis include deep vein thrombosis (DVT) and pulmonary embolism (PE), as well as visceral or splanchnic vein thrombosis, together described as VTE (*Khorana*, 2012).

Cancer continues to pose a costly and growing international threat toward modern day society. Among its many direct and indirect complications is its role as a major risk factor for venous thromboembolism (VTE), discovered in a fifth of all cancer patients and as many as half on postmortem examination (*Gao et al.*, 2004).

It is well established that cancer patients are at an increased risk of venous thromboembolism (VTE). In fact, the presence of malignancy increases the risk of (VTE) by a

factor of 4 to 6, and large population-based studies show that the incidence of vte is on the rise (*Stein et al.*, 2006).

Understanding underlying epidemiology, pathophysiology and natural history in deep venous thrombosis is essential in guiding appropriate prophylaxis, diagnosis and treatment. Deep venous thrombosis is usually silent in nature in most of hospitalized patients and usually presented by nonspecific symptoms and signs (*Natasha Mathias et al.*, 2016).

In1856 agerman pathologist Rudolf Virchow postulated the interplay of three processes resulting in venous thrombosis known as Virchow triads these triads are description for the components of therisk factors of deep venous thrombosis which include abnormalities of: thrombosis, abnormalities of blood flow and vascular injury remain applicable today (*Christina et al.*, 2013).

Historically, in 1823, the French physician Jean-Baptiste Bouillaud published what appears to be the first report of an association between cancer and thrombosis. In 1865, another French physician Armand Trousseau reported an association between gastric cancer and venous thrombosis almost 150 years ago, yet its exact pathophysiology remains poorly understood. These reports