New Oral Anti-coagulants In Management Of Deep Venous Thrombosis

An Essay

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By

Mahmoud Ezzat Mohamed Khalil

(M.B,B.Ch)

Supervisors

Prof. Dr. Amr Ahmed Abd Elaal

Professor of General Surgery
Faculty of Medicine, Ain Shams University

Dr. Abd El Rahman Mohamed Ahmed

Lecturer of General & Vascular Surgery
Faculty of Medicine, Ain Shams University

Dr. Mohamed Mahmoud Zaki

Lecturer of General & Vascular Surgery
Faculty of Medicine, Ain Shams University

Faculty of medicine
Ain shams University

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محمود عزت محمد خليل

بكالوريوس الطب و الجراحة

المشرفون

الأستاذ الدكتور / عمرو أحمد عبد العال

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الدكتور / محمد محمود زكى

مدرس الجراحة العامة وجراحة الأوعية الدموية

كلية الطب - جامعة عين شمس

كلية الطب

جامعة عين شمس

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Mahmoud Ezzat

- **Key word:**

Deep venous thrombosis (DVT), New oral anticoagulants (NOACs), Rivaroxiban, Dabigatran , warfarin.

- **Abstract:**

Deep venous thrombosis is a major problem, because of its increased morbididty and mortality. Treatment with anticoagulations still the mainstay. New oral anticoagulants (NOACs) have advantages over VKAs and traditional treatment.

Table of Contents

List of figures

List of Tables

List of Abbreviations

Abb.	Meanning
ACCP	American college of chest physicians
AF	atrial fibrillation
APA	Antiphospholipid antibodies
APTT	Activated partial thromboplastin time
AT	antithrombin
BD	Twice daily
CFV	Common femoral vein
DVT	Deep venous thrombosis
FVL	Factor V Leiden
FXa	factor Xa
GSV	Great saphenous vein
HIT	Heparin induced thrombocytopenia
INR	International normalized ratio
I**V**	Intravenous
IVC	Inferior vena cava

List of Abbreviations

LMWH Low molecular weight heparin

MRI Magnetic resonance imaging

NOACs New oral anticoagulants

NSAIDs Non-steroidal anti-inflammatory drugs

OD Once daily

PE Pulmonary Embolism

RCTs Randomized controlled trials

SC Sub-cutaneous

SFJ saphenofemoral junction

SPJ saphenopopliteal junction

SSV Short saphenous vein

UFH Unfractinated heparin

VKAs Vitamin K antagonists

VTE Venous Thromboembolism

Introduction

Venous thrombo-embolism (VTE) manifests as deep venous thrombosis (DVT) and/or pulmonary embolism (PE). Per 1000 persons in the general population, the annual incidence is 1 to 2 cases. Complications can occur at all stages of the disease, ranging from recurrent PE or thrombosis to post-thrombotic syndrome and death ***(Eichinger ., 2013).***

For decades, the gold standard of anti-thrombotic therapy has been based on heparins and vitamin K antagonists (VKAs) and has successfully reduced the complications mentioned above. However, this therapy has significant disadvantages; the narrow therapeutic range and the need for dosage adjustment with VKAs, interactions with food and concomitant medications, and a complicated and time consuming bridging on

attempting invasive interventions ***(Verhamme & Bounameaux., 2014).***

This has led to the development of new oral anticoagulants (NOACs) beginning in 2003. Two types of new anticoagulants have been developed: direct factor Xa inhibitors and direct factor IIa (thrombin) inhibitors ***(Hirschl & Kundi., 2014).***

Direct thrombin inhibitors selectively bind to thrombin thereby preventing the sequence of events of the coagulation cascade and the conversion of fibrinogen to fibrin. Direct factor Xa inhibitors block the generation of thrombin from prothrombin without relying on its physiologic inhibitor Antithrombin ***(McRae., 2014)***.

These factor Xa inhibitors and thrombin inhibitors have dose-proportional pharmacokinetics and their half-life time is

similar, ranging from a minimum of 6 to a maximum of 17 h ***(McRae., 2014).***

The NOACs have advantages over warfarin in many of these respects, including more predictable pharmacokinetics, which eliminate the need for routine monitoring, a rapid onset of action and shorter half-life, and fewer drug and food interactions ***(Hokusai., 2013).***

The NOACs that are either approved or in late stage development include the direct factor Xa inhibitors, rivaroxaban, apixaban, and edoxaban, as well as the direct thrombin inhibitor dabigatran.

Rivaroxaban is currently FDA-approved NOAC for treatment of DVT, having been granted this approval in November 2012 ***(Timothy et al., 2014).***

The biggest drawback is uncertainty in case of bleeding due to the fact that on the contrary to VKAs. Furthermore the quantitative assessment of the drug exposure and the assessment of the anticoagulant effect in emergency or other special situations is unestablished ***(Agnelli et al., 2013)***.

An important precondition for clinical decision-making, however, is the knowledge of the specific properties of each substance, its efficacy in preventing complications and its safety with respect to side effects of anticoagulation ***(Schulman et al., 2014).***

At present Rivaroxiban, Dabigatran, Apixaban and Edoxaban are licensed for treatment and prevention of VTE and FDA-approved for this purpose***(Hurst et al., 2016).***

All randomized controlled trials (RCTs) for this indication have already been

published and it is therefore possible and useful for future therapy decisions to summarize and compare their performance ***(Schulman et al., 2014).***