

# The Development of Anticoagulants

## 1930s

### Heparin (unfractionated)<sup>1</sup>

✓ Effective (as used according to prescriber information)



Injection

## 1940s

### Vitamin K Antagonists (VKAs) e.g. warfarin<sup>1</sup>

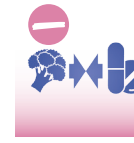
✓ Effective (if INR is in therapeutic range)  
✓ Oral administration



Regular coagulation monitoring



Dose adjustment



Many food and drug interactions

## 1980s

### Low Molecular Weight Heparins (LMWHs) e.g. enoxaparin<sup>2</sup>

✓ Effective (as used according to prescriber information)



Injection



Can accumulate in patients with kidney impairment

## 2000s

### Novel Oral Anticoagulants (OACs)

- ◆ Direct Factor Xa Inhibitors (Xabans) e.g. rivaroxaban, apixaban and edoxaban<sup>3</sup>
- ◆ Direct Thrombin Inhibitors (DTIs) e.g. dabigatran<sup>4</sup>

**1st Xaban Approved 2008**

### Rivaroxaban

Now approved in five indications in seven areas of use, it is the most prescribed novel OAC in the world and its investigation - both completed and ongoing - will include more than 275,000 patients in clinical trials and real world settings<sup>6,7</sup>

Xabans can overcome the limitations of older anticoagulants to prevent and/or treat venous and arterial thromboembolic (VAT) conditions<sup>5</sup>



Oral administration



Rapid onset of action



Predictable anticoagulation without need for routine monitoring or dose adjustment

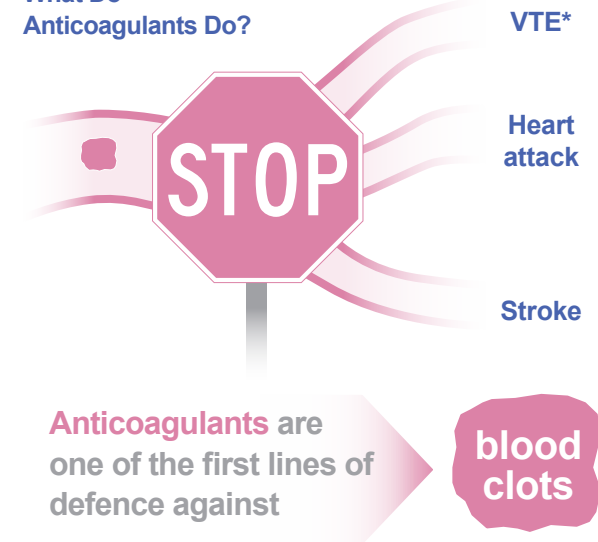


Low risk of drug-drug interactions



No significant food interactions

### What Do Anticoagulants Do?



\*Venous thromboembolism (VTE)



It is important doctors and patients discuss the benefits and risks of the different anticoagulants to help identify the best treatment for optimal protection that is suited to maintain their quality of life



**References:** 1) Ansell J, et al. The pharmacology and management of the vitamin K antagonists: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. Chest. 2004. 126 (3 Suppl): 204S-233S 2) Hirsh J, Anand SS, Halperin JL, et al. Guide to anticoagulant therapy: Heparin : a statement for healthcare professionals from the American Heart Association. Circulation. 2001;103,(24)2994-3018 3) Graff J, Harder S. Anticoagulant therapy with the oral direct factor Xa inhibitors Rivaroxaban, apixaban and edoxaban and the thrombin inhibitor dabigatran etexilate in patients with hepatic impairment. Clin Pharmacokinet. 2013; 52(4) 243-54 4) Lee CJ, Ansell JE. Direct thrombin inhibitors. BJCP. 2011. 72(4) 581-592 5) Cohen AT, Imfeld S, et al. Phase III Trials of New Oral Anticoagulants in the Acute Treatment and Secondary Prevention of VTE: Comparison and Critique of Study Methodology and Results. Adv Ther (2014) 31:473-493 6) Xarelto Summary of Product Characteristics as approved by the European Commission 7) IMS Health MIDAS, Database: Monthly Sales January 2015.