VENOUS THROMBOEMBOLISM IN FOOT SURGERY: HOW BIG IS THE RISK, REALLY?

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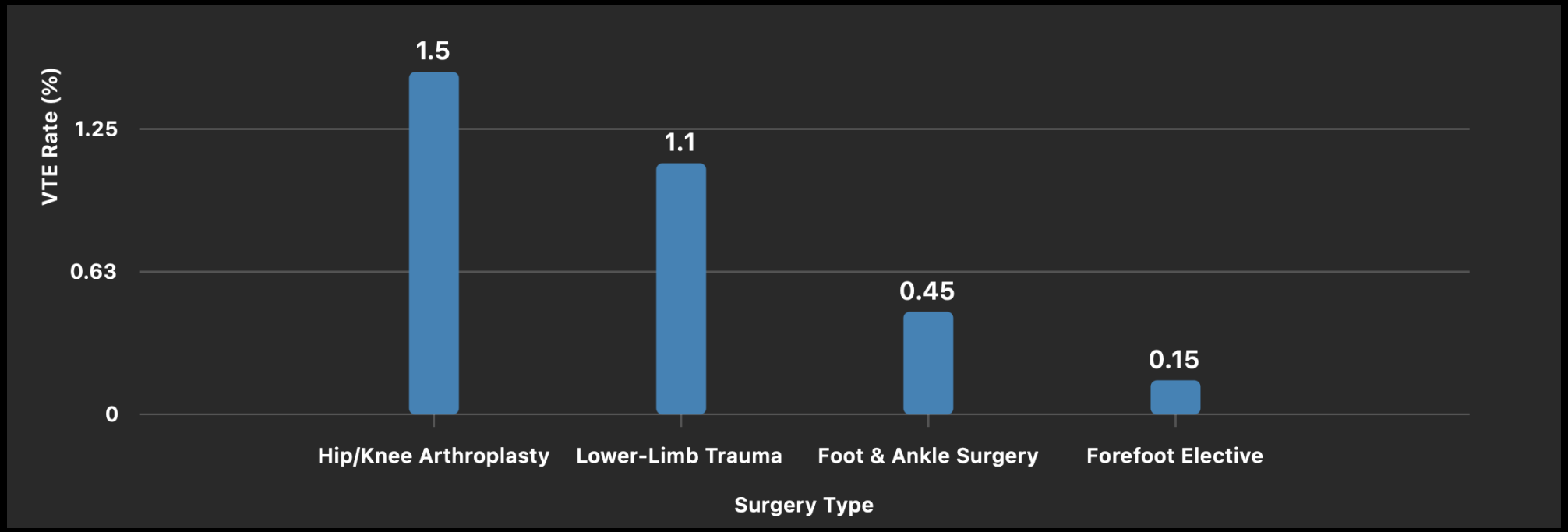
What is the concern?

- NHS economic burden from venous thromboembolic events (VTEs) approx. £640m

  (Benjamin et al, 2021)

- Surgery, general anesthesia, post-operative immobilization, reduced weightbearing can increase the risk of VTE
- What is the real question:
  - How big is the risk?
  - Who is at risk?

Symptomatic Rates



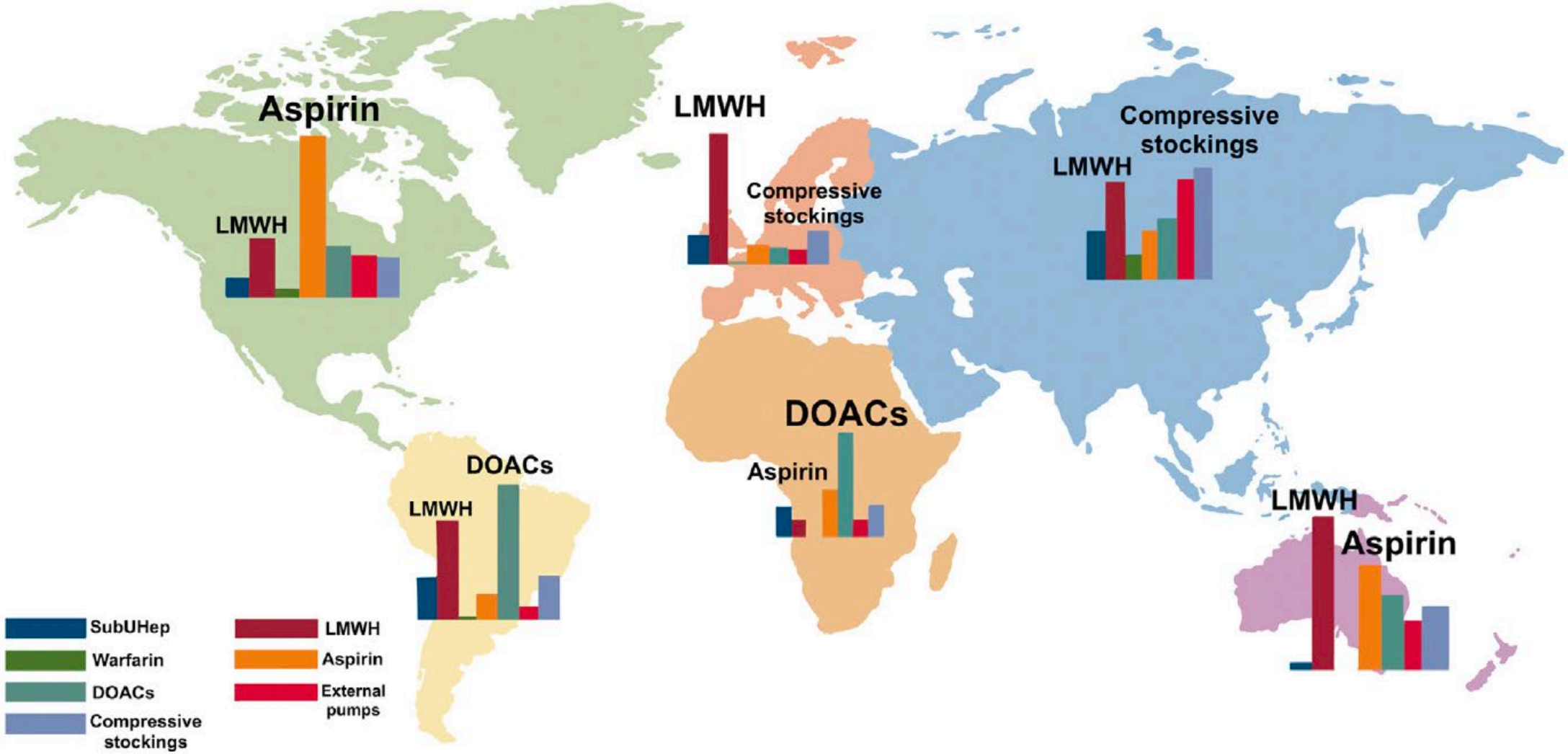
Jameson SS et al. *Venous thromboembolic events following foot and ankle surgery in the English NHS.* J Bone Joint Surg Br.
Mizel MS et al. *Symptomatic venous thromboembolism after foot and ankle surgery.* Foot Ankle Int.

Mechanical Prophylaxis for All

- Early mobilization
- Hydration
- Calf exercises
- Compression when appropriate

Worldwide Survey (JFAS 2024)

- 693 orthopedic foot and ankle surgeons
- 97% stated prophylaxis is necessary in foot and ankle surgery
- Acetylsalicylic acid (Aspirin), LMWH, Direct-oral anticoagulants used in order
- Prior DVTs, immobility, obesity, inherited thrombophilia main risk factors for use
- Only 49% aware of risk assessment scores (31% use them)


Aspirin
LMWH
LMWH
Compressive stockings
Compressive stockings
LMWH
DOACs
Aspirin
DOACs
LMWH
LMWH
Aspirin
SubUHep
Warfarin
DOACs
Compressive stockings
LMWH
Aspirin
External pumps

Outcome	Number of Surgeons Number/Total Number (%)
Prophylaxis against VTE in elective and traumatic foot and/or ankle surgery is	
Mandatory	161/691 (23)
Sometimes needed	508/691 (74)
Waste of time	22/691 (3)
Why do you prescribe prophylaxis?	
Prevents VTE which outweighs bleeding risk	342/680 (50)
Act in accordance with hospital/national guideline	157/680 (23)
Clinical experience shows a beneficial effect	70/680 (10)
Risk of complications is very small	111/680 (16)
Main reason to prescribe prophylaxis	
As answered before	289/494 (59)
Feel compelled by patients' request	8/494 (2)
For medico-legal reasons	170/494 (34)
Other, please specify	27/494 (5)

Abbreviations: FA; foot and/or ankle; VTE, venous thromboembolism.

Guidelines & Position Statements

- National Institute for Health and Care Excellence NG89
- American College of Foot and Ankle Surgeons
- International Consensus Meeting
- American Orthopedic Foot and Ankle Society
- British Orthopedic Foot and Ankle Society

NICE NG89

- No blanket recommendation for foot and ankle
- Patients undergoing lower extremity orthopedic surgery (especially when reduced WB post-op) tailored to individual risk factors

NICE

- Risk assess **every** patient
- Consider prophylaxis if:
  - Surgery >90 minutes
  - Patient **cannot weight-bear**
  - Patient has **significant VTE risk factors**
- Immobilization (cast/boot) = VTE risk → prophylaxis based on **risk–benefit**
- No routine anticoagulation for **low-risk, mobile** patients
- Encourage **early mobilization**

CAPRINI

- Point-based **VTE risk scoring tool**
- Assigns points for:
  - ***Age***, ***BMI***, ***surgery duration***
  - ***Immobilization*** *(cast/boot)*
  - ***Cancer***, ***OCP/HRT***, ***varicose veins***
  - ***History of VTE*** *or* ***thrombophilia***
- Higher total score = higher VTE risk
- **Score ≥5:** consider chemical prophylaxis
- Not validated specifically for foot/ankle, but widely used

ACFAS Clinical Consensus Statement 2017

- Routine chemical prophylaxis is not warranted
  - Foot and ankle surgery
  - Injuries requiring immobilization

Risk factors for venous thromboembolism disease during management of foot and ankle conditions

Patient Specific	Treatment Specific	Surgery/Injury Specific
Primary		
Personal history of VTED	Immobilization >4 wk	
Hypercoagulability		
Active/recent (<6 mo) cancer		
Secondary		
Advanced age (>60)*	Non-weightbearing	Achilles tendon rupture‡
Obesity (BMI >30)	Hospitalization	Ankle fracture‡
Family history of VTED	Bed rest	Total ankle replacement
OCP or HRT use†		Hindfoot arthrodesis
Varicose veins		General anesthesia
Diabetes mellitus or >1 comorbidity		
Severe foot/ankle injury		

AOFAS Position Statement 2020

- Exact risk is unclear
  - Wide variety of injuries, surgeries, rehab protocols
  - If sufficient risk factors are present, VTE prophylaxis should be considered
  - “Sufficient risk” definition is unclear

AOFAS Position Statement 2020

- Key data points from the review:
  - RCT Plaster cast immobilizations
    - 4.3% VTE without prophylaxis vs. 0% VTE with prophylaxis
  - VTE rate 1% in over 45,000 patients undergoing ankle fracture ORIF
  - 2,600 patients undergoing elective foot and ankle surgery
    - VTE 0.42% with aspirin vs. 1.43% with no prophylaxis
  - In general, VTE rates around 1-2%

ICM-VTE 2022

- Non-weightbearing increases the risk for VTE
  - Mitigate this risk by load-bearing at least 50% on the surgical limb
- Patient specific risk factors are likely to contribute more than surgical procedure (excluding ATR)
  - Age >50 years
  - Splint or cast immobilization
  - Charlson Comorbidity index >2
  - Varicose Veins
  - History of DVT
  - Hypercoagulability disorder
  - Inflammatory arthritis

ICM-VTE 2022

- Do not recommend routine prophylaxis in low-risk patients undergoing forefoot or midfoot surgeries, especially if immediate WB
- Achilles tendon repair routine prophylaxis not routinely recommended, factor in comorbidities
  - Same for rearfoot & ankle surgeries

BOFAS 2025 VTE Position Statement

"Routine use of chemical thromboprophylaxis is not beneficial for low risk patients with foot and ankle injuries or those undergoing foot and ankle surgery."

- Malhotra et al 2024

Increased risk categories:

- History of VTE, increased BMI – Mangwani et al 2015
- Achilles ruptures – Mangwani et al 2023

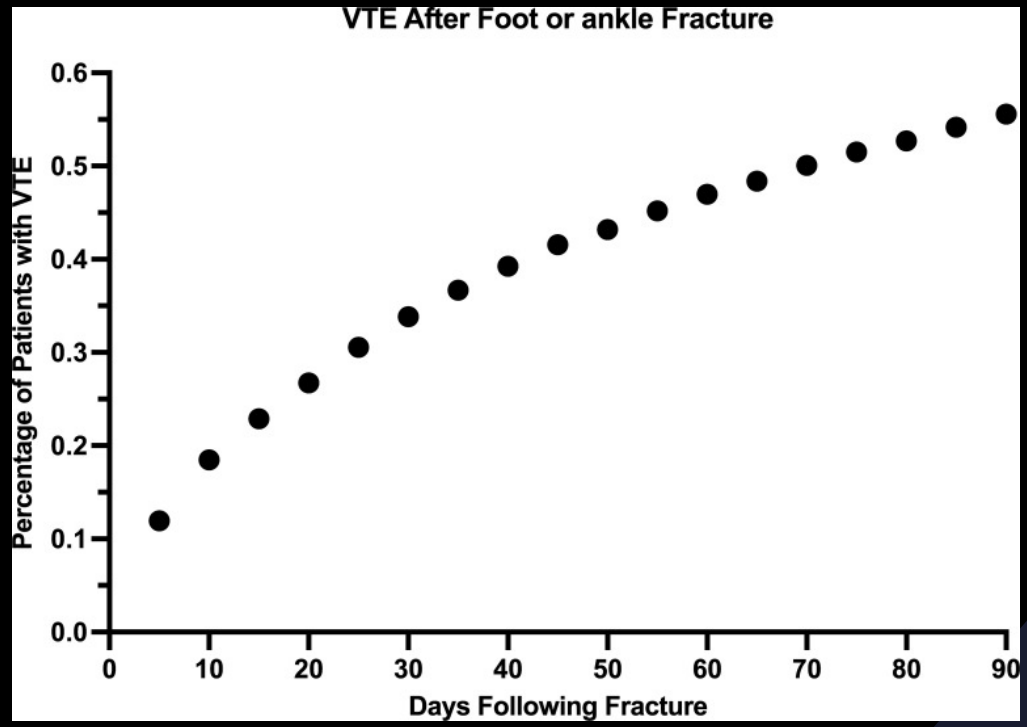
Richey, Weintraub & Schuberth, 2019

- 22,486 cohort retrospective study - VTE incidence 0.9%
- Predictive risk factors: The risk of VTE increased significantly with 3 or more risk factors
  - Obesity
  - History of VTE
  - Postoperative NWB >2 weeks
  - Hormonal replacement use/oral contraception
  - Anatomic location of surgery
  - Procedure duration >60 min
  - General Anesthesia
  - History of trauma

"Among patients with 3 or more risk factors, the use of chemoprophylaxis may be warranted"

Gouzoulis et al, 2022

- Retrospective 298,886 patients with isolated foot or ankle fractures identified
  - *1,661 (0.56%) had VTE within 90 days following fracture*
    - *27.3% within first week*
    - *49.8% within first 3 weeks*
  - *Risk factors:*
    - *Prior VTE*
    - *Factor V Leiden*
    - *Active cancer*
    - *Metatarsal/ankle/calcaneal fracture*
    - *Surgical treatment*



Claveau et al, 2023

- Retrospective cohort study of patients undergoing prophylactic treatment
- 5/425 (1.2%) diagnosed with VTE

  No different than without prophylactic treatment in other publications
- 1/425 (0.2%) with PE

Marder et al, 2024

- 468,699 surgeries
- Acute VTEs:

  Achilles tendon repair 0.72%

  Ankle fracture surgery 0.33%

  Knee arthroscopy 0.29%

  Ankle arthroscopy 0.24%

VTE Following Achilles Tendon Rupture

- UK-Foot and ankle Thrombo-embolism (UK-FATE) audit 2025
- 11,363 patients in total audit
  - 1084 with ATR
  - 24% surgical, 76% non-surgical
- VTE 3.69% compared to 0.57% of all other foot and ankle surgeries
- 6.5x more likely to have symptomatic VTE compared to other foot and ankle surgery
- No difference in comorbidity or treatment/rehab regimen between cohorts

Take Home Points

- Average VTE risk after foot surgery is about 1%
- Use individualized assessments rather than blanket use
- Be cautious with Achilles Tendon ruptures
- Mechanical prophylaxis for all, chemoprophylaxis for the truly high risk

  We need better research to narrow down the true at-risk patients

- The question really becomes:

  Is the adverse risk from prophylactic treatment greater than 1-2%?

THANK YOU

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