Managing Perioperative Anticoagulation

Edie Shen MD

Anticoagulation

- VKA — Warfarin (Coumadin)
- DOACs
  - Direct Thrombin Inhibitor — Dabigatran (Pradaxa)
  - Factor Xa Inhibitor — Rivaroxaban(Xarelto)
    Apixaban(Eliquis)
    Edoxaban (Savaysa)

Case #1

63 yo man with history of COPD, claudication and mechanical AVR, anti-coagulated with warfarin

— slated for an aorto-bifemoral bypass

Warfarin: Bridging

Table 3
Thrombotic risk stratification by indication for anticoagulant

Thromboembolic Risk	Indication for Anticoagulant		
	Mechanical Valve[a]	Atrial Fibrillation	Venous Thromboembolism
Low	Bileaflet aortic prosthesis without CHADS risk factors	CHADS 0–2 without previous stroke/TIA	VTE >12 mo prior
Moderate	Bileaflet aortic prosthesis with CHADS score of ≥1	CHADS 3–4	• VTE within the past 3–12 mo • Nonsevere thrombophilia • Recurrent VTE • Active cancer
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Douketis et al. *Hematol Oncol* Clin N Am 30 (2016) 1073–1084

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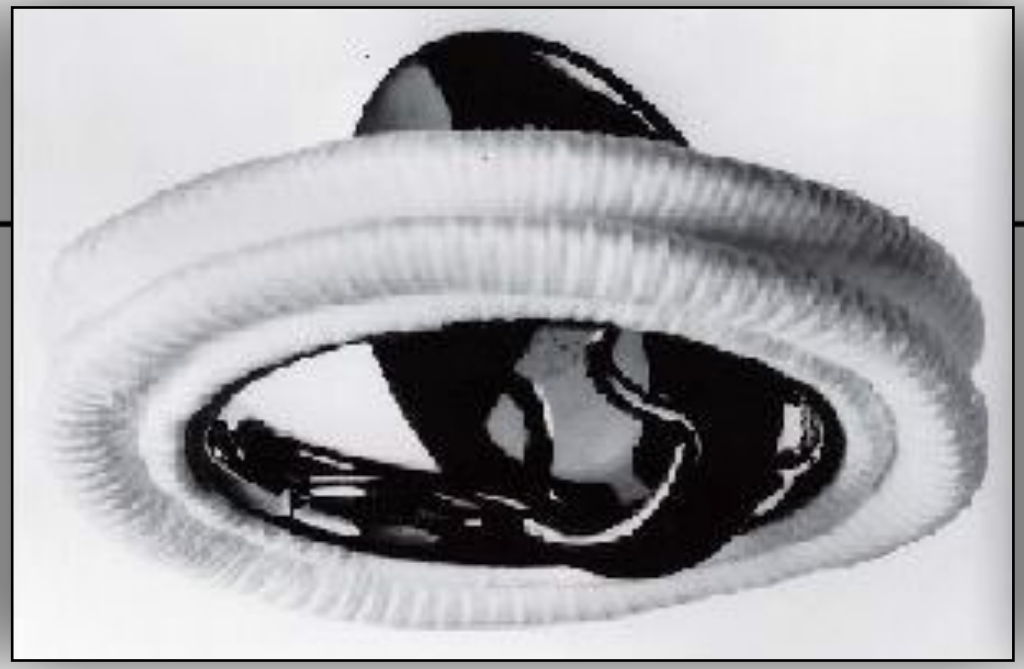
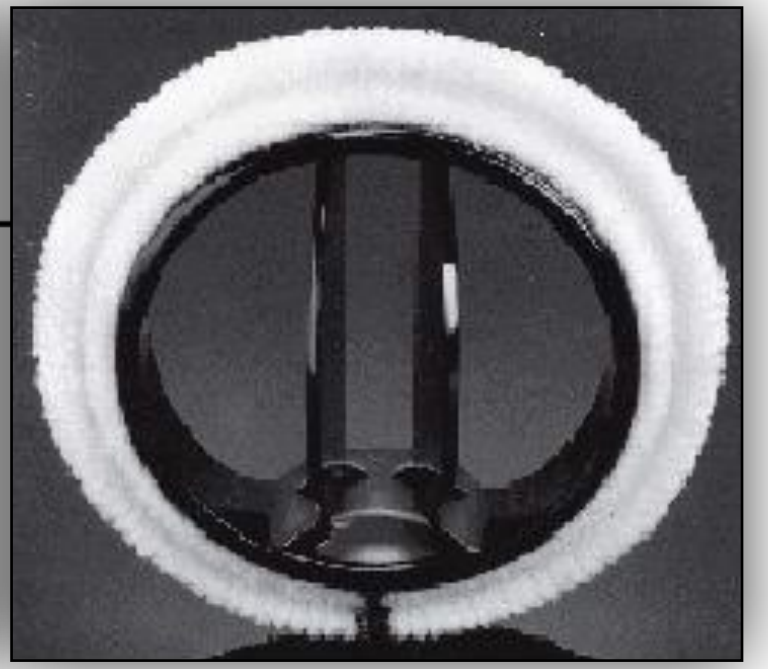
Low			
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— slated for an aorto-bifemoral bypass

→ **No need for bridging**

Case #2

78 yo patient with Afib, DM, RA, HTN, CHF EF 35%, anti-coagulated with warfarin

— Scheduled for ZFEN

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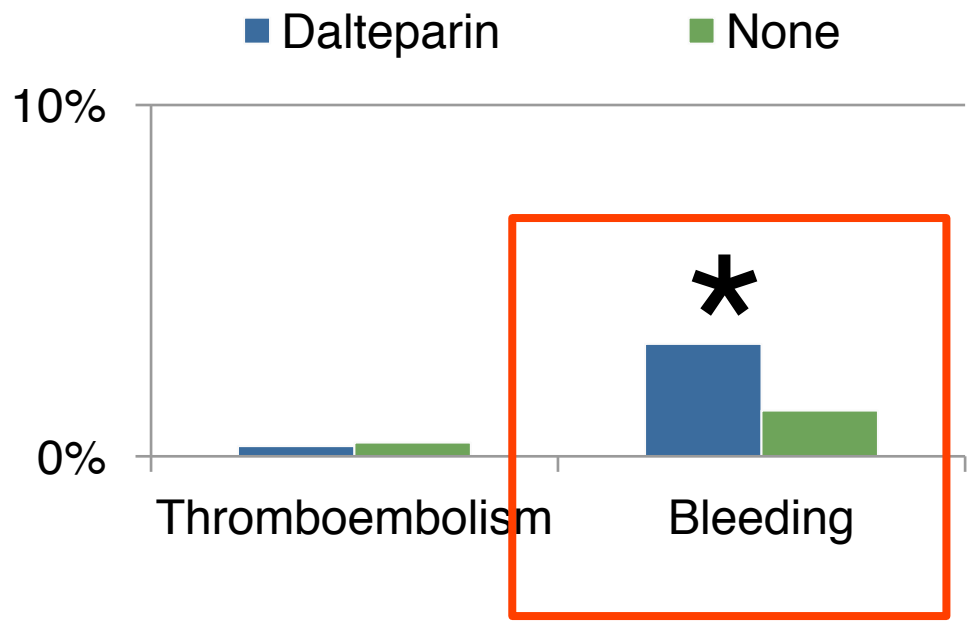
Atrial Fibrillation - BRIDGE trial

- 1884 patients with Afib with peri-procedural warfarin interruption
- Exclusion Criteria
  - Mechanical valve
  - Recent TE event
  - Recent CVA/TIA



Douketis et al, Engl J Med 2015;Jun 22

Atrial Fibrillation: In General, don't Bridge

- May consider if very high CHADS2, or past CVA

- BRIDGE trial mean CHADS2 score — 2.3

Case #2

78 yo patient with Afib, DM, RA, HTN, CHF EF 35%, anti-coagulated with warfarin

— Scheduled for ZFEN

→ **no bridging**

Case #3

60 yo woman with HTN, poorly controlled DM

- — PE 6 weeks ago following spine surgery on warfarin
- — Presents with ischemic RLE
- — Diagnosed with critical limb ischemia

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- — PE 6 weeks ago following spine surgery on warfarin
- — Presents with ischemic RLE
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- → **LMWH bridging to heparin gtt**

Perioperative Warfarin Management

Typically discontinue warfarin five days before elective surgery

- Last dose of warfarin is given on day minus 6
- Many suggest day before surgery INR with 1 or 2 mg vit K for INR>1.5

Preoperative timing of bridging

- Start LMWH bridging three days before a planned procedure
- Last dose enoxaparin 24 hours prior to surgery.
- If a once-daily regimen is given (eg, dalteparin 200 international units/kg), **one half of the total daily dose** is given 24 hours prior to surgery.

Restarting the Warfarin

- Surgeon Discretion
- POD0 or 1 warfarin
- More likely to bridge post-operatively
  - Full-dose bridging generally at 48-72 hours
    - Can start proph dose
      - Enoxaparin 40 qd
      - Exoxaparin 40 BID

Case #4

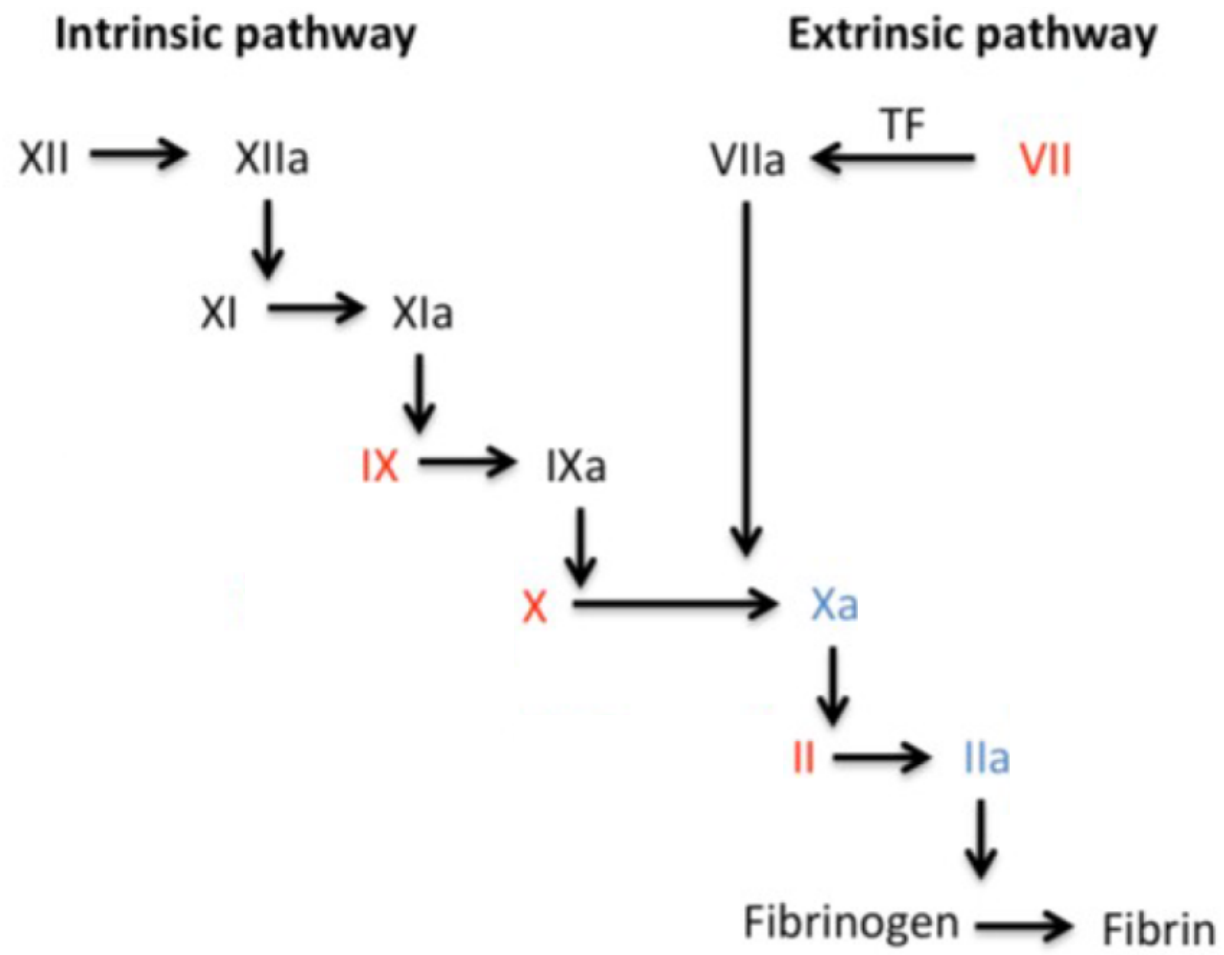
58 yo man with history of Afib, TIA 2013, CKD stage 3b (Cr 2.0) on dabigatran

— scheduled for fem-pop bypass

Overview of DOACs

- Preferred anticoagulant
- Half the risk of ICH
- Faster onset
- Renal clearance
- Contraindicated liver disease
- Not reversible

Sites of Action



Nutrients **2015**, *7*(11), 9538-9557;

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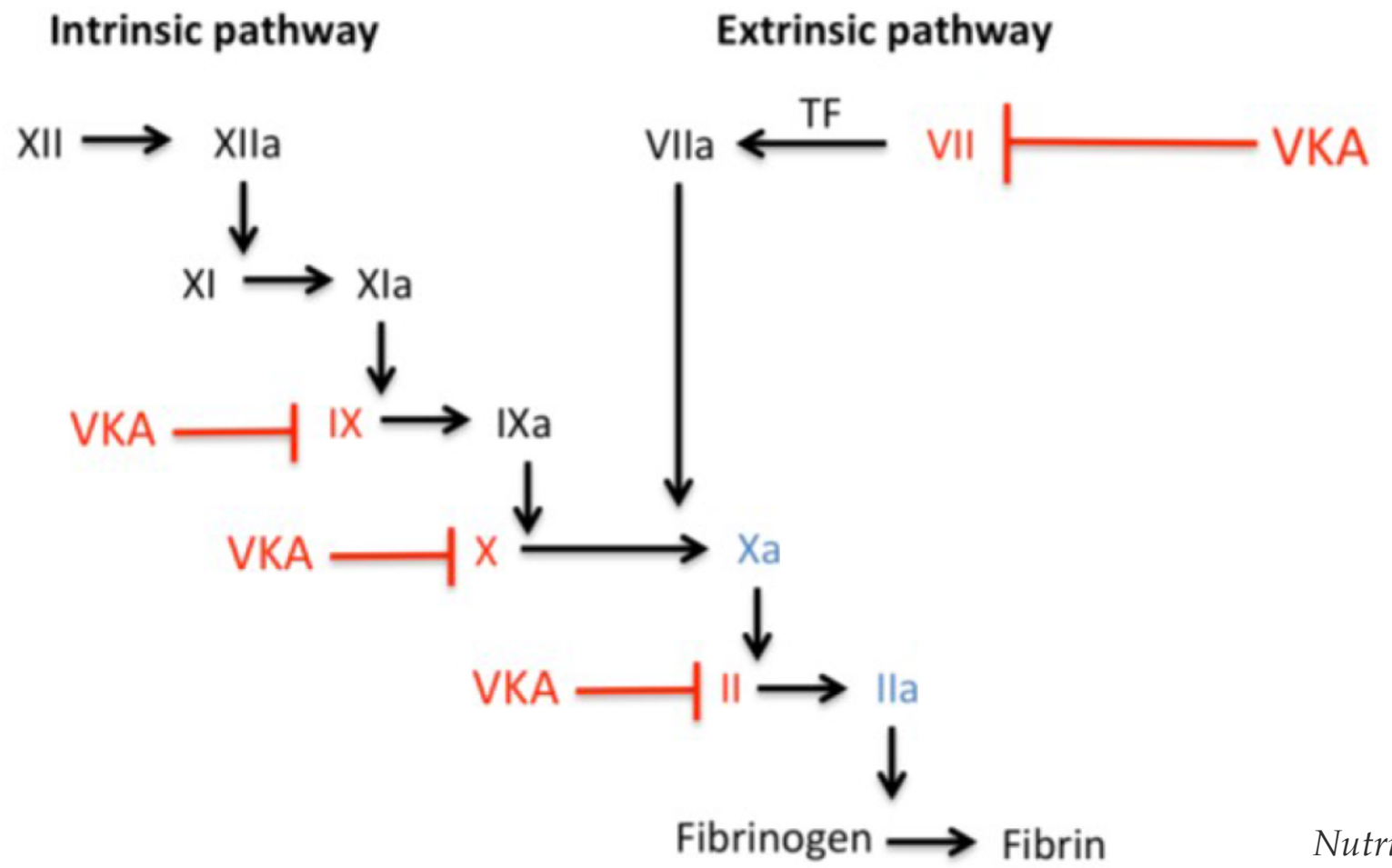

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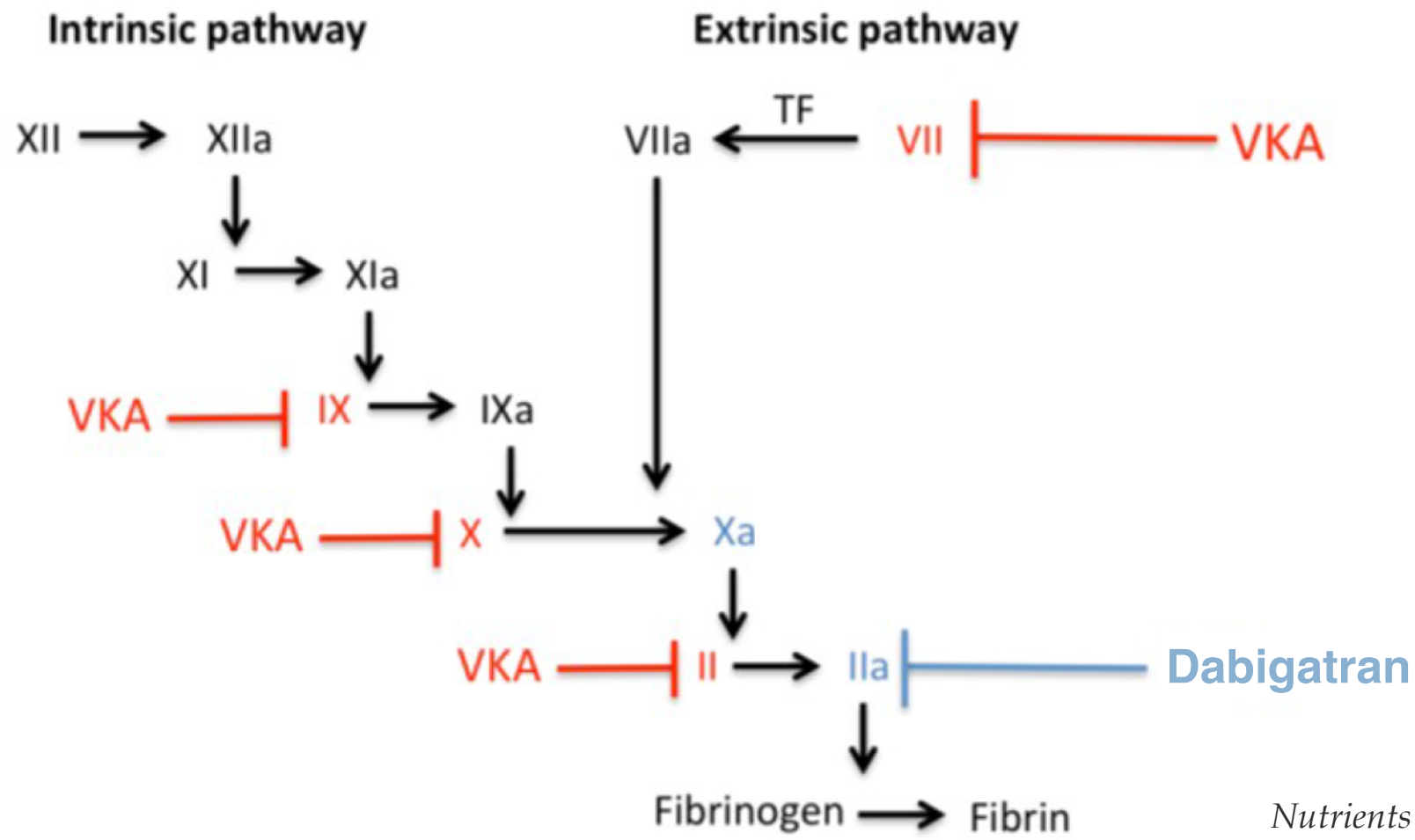

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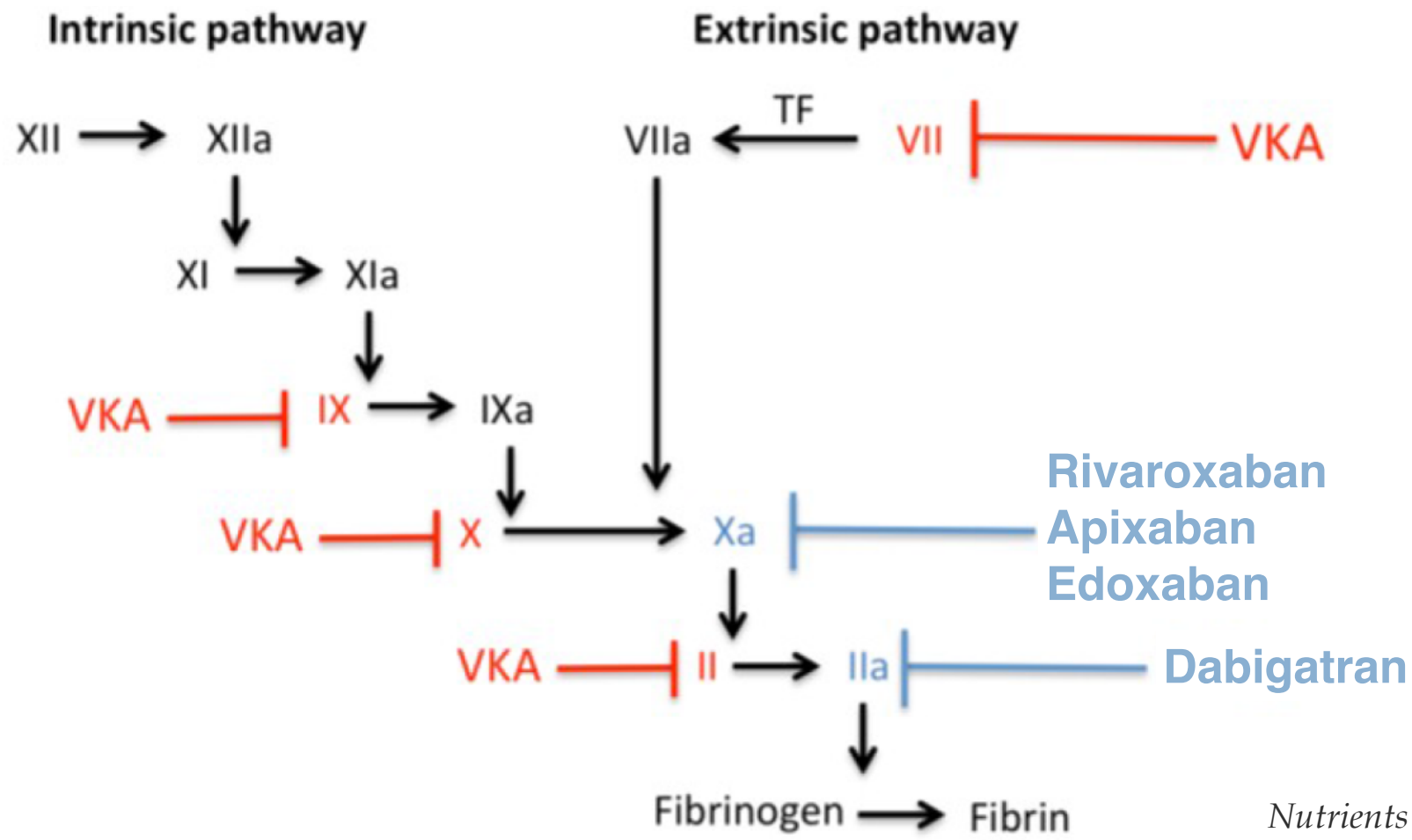

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Preoperative Management: DOACs

- Generally no bridging is needed
  - Postoperative ileus
  - Only one has a reversal agent: Idarucizumab (Praxbind)

Table 4
Preoperative DOAC management based on drug half-life and surgical bleed risk

	Interval Between Last DOAC Dose and Procedure[a]	
	Low-Bleed-Risk Procedure[b]	High-Bleed-Risk Procedure[b]
Creatinine Clearance (mL/min)	2–3 Drug Half-Lives	4–5 Drug Half-Lives
Dabigatran		
>50	At least 24 h (skip 2 doses)	At least 48 h (skip 4 doses)
30–50	At least 48 h (skip 4 doses)	At least 96 h (skip 8 doses)
Rivaroxaban		
>50	At least 24 h (skip 1 dose)	At least 48 h (skip 2 doses)
30–50	At least 24 h (skip 1 dose)	At least 48 h (skip 2 doses)
Apixaban		
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25–50	At least 24 h (skip 2 doses)	At least 48 h (skip 4 doses)
Edoxaban		
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Case #4

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— scheduled for fem-pop bypass

→ **Hold dabigatran for 96 hours**

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Postop: Restarting DOACs

- Generally restart full dose DOACs
  - 24 hours after minor surgery
  - 48-72 hours after major surgery

- Can start prophylactic dose of anticoagulants at first
  - Dalteparin 5000 IU daily
  - Enoxaparin 30 mg BID
  - Dabigatran 75-110 BID
  - Rivaroxaban 10-15 mg qd
  - Apixaban 2.5 mg BID.

Holding DOACs Preop: High Risk surgery

- Rivaroxaban 48 hours
- Dabigatran 48-120 hours
- Apixaban 48-72 hours
- Edoxaban 48 hours

2016 Updates to CHEST Guidelines re: VTE

- Proximal DVT/PE: Rivaroxaban/Apixaban
- Unprovoked 1st proximal DVT/PE: Extended
- Isolated distal DVT: treat or not?
- Subsegmental PE

  — look for proximal DVT