Drugs and Devices for Atrial Fibrillation

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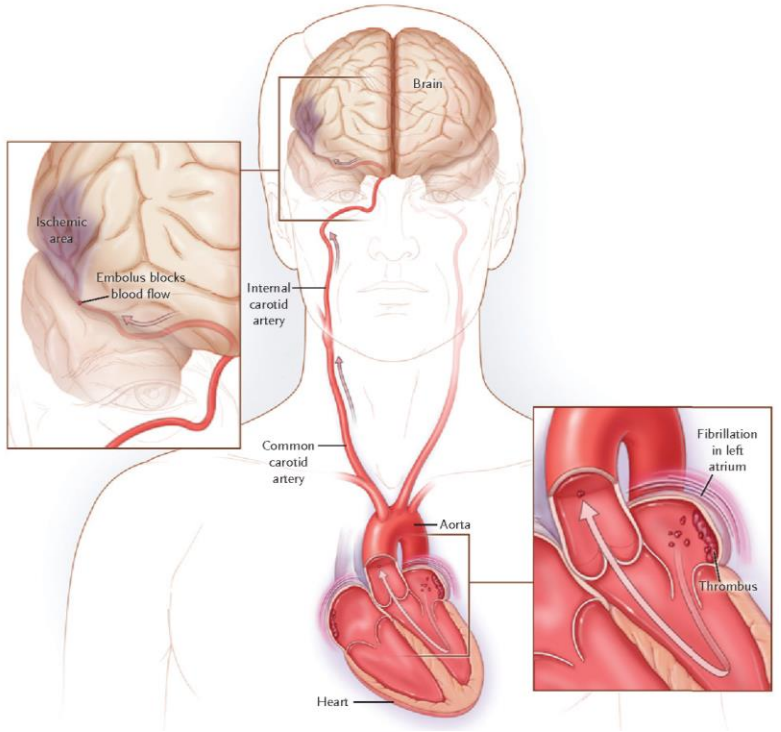
Disclosures

Nothing to disclose

Why Atrial Fibrillation Matters in Stroke

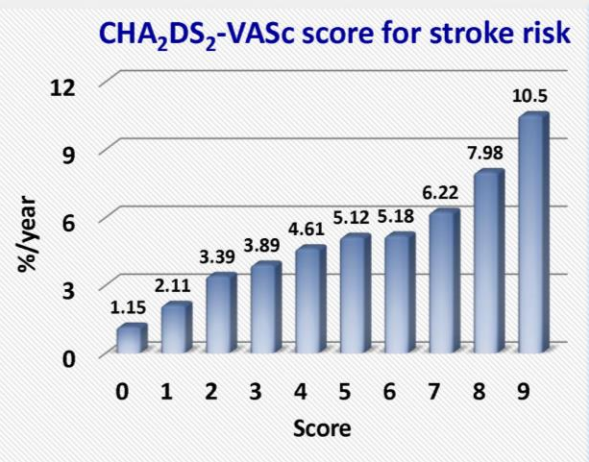
- Patients with AF not on OAC have a 4.1% annualized risk of stroke (can go up to 20%)
- ~25% of ischemic strokes are cardioembolic
- Up to 30% of ESUS cases may be due to occult AF
- High mortality and disability from AF-related stroke



Stroke Risk Stratification

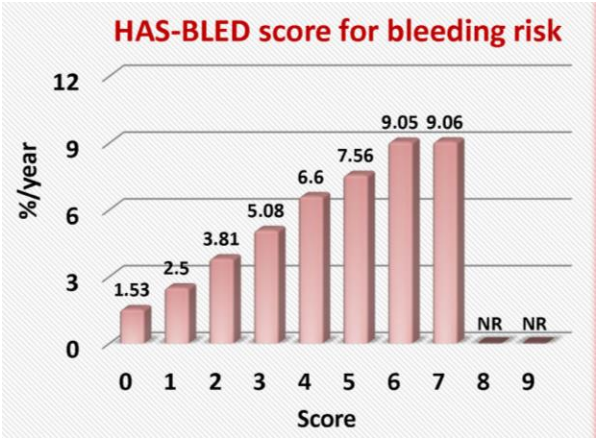
- **CHA_2DS_2-VASc Score (stroke risk):**
  - C: CHF (1), H: HTN (1)
  - A: Age ≥75 (2)
  - D: Diabetes (1)
  - S: Stroke/TIA (2)
  - V: Vascular disease (1)
  - A: Age 65-74 (1)
  - Sc: Female (1)

Anticoagulate if ≥2 (men)
or ≥3 (women)



- **HAS-BLED Score (bleeding risk):**
  - H: uncontrolled HTN >160
  - A: Abnormal renal/liver (Cr >2.26 / cirrhosis)
  - S: H/o Stroke
  - B: Bleeding history
  - L: Labile INRs
  - E: Elderly (>65)
  - D: Drugs ↑bleeding / high alcohol use

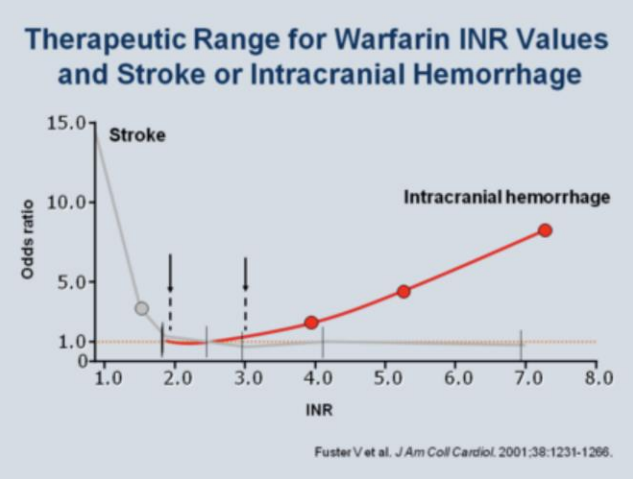
- Low risk: 0
- Moderate risk: 1–2
- High risk: ≥3



Anticoagulants: The Cornerstone

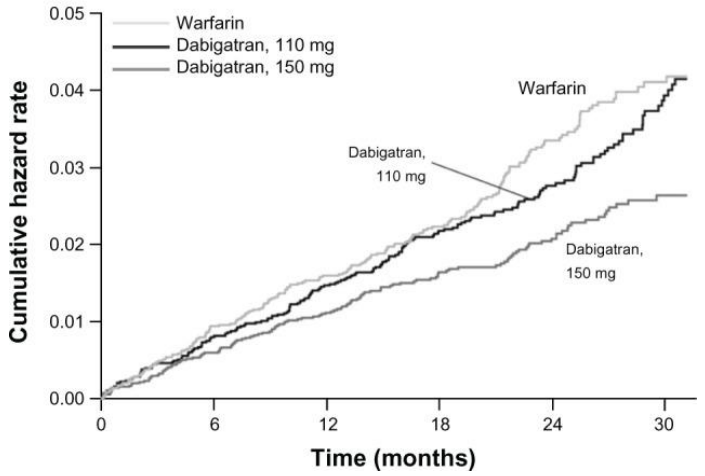
- **DOACs (Direct Oral Anticoagulant) are preferred** over warfarin in non-valvular AF

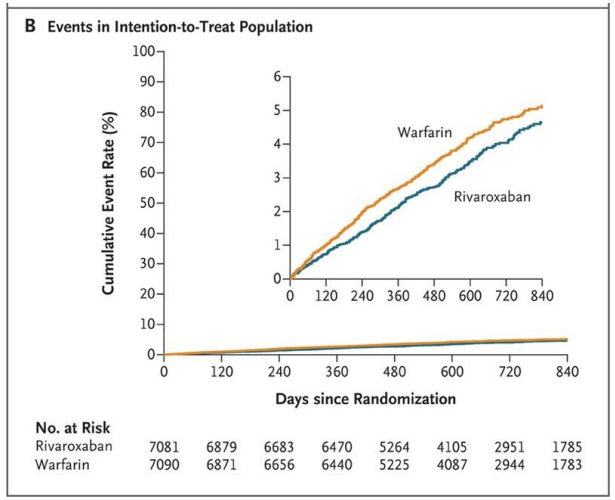
- Warfarin
  - Narrow therapeutic window
  - Numerous factors affecting maintenance dose (food and medications)
  - Needs close monitoring and dose adjustments

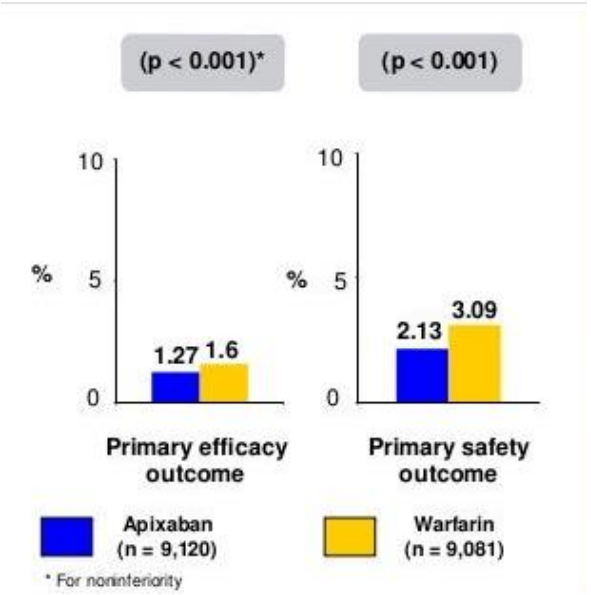


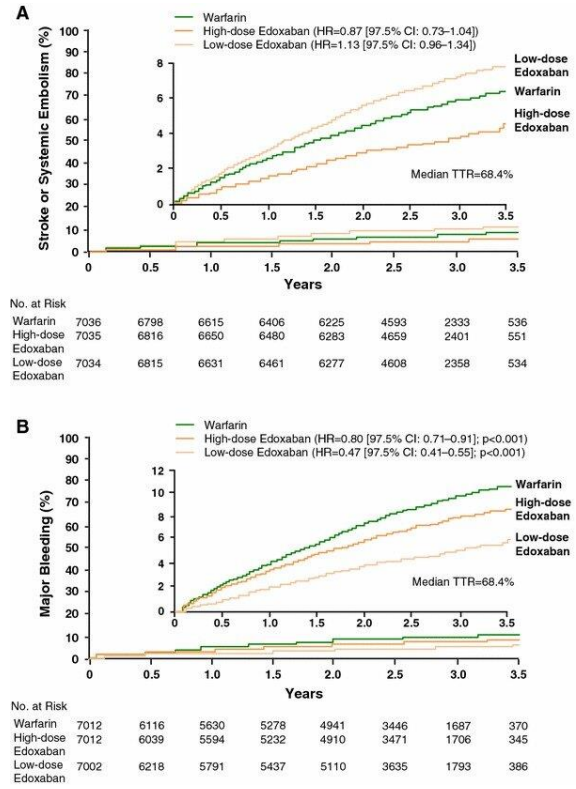
Anticoagulants: The Cornerstone

- DOAC Key Trials:
  - RE-LY: Dabigatran 150 mg superior to warfarin in stroke reduction
  - ROCKET-AF: Rivaroxaban non-inferior to warfarin for stroke, lower ICH
  - ARISTOTLE: Apixaban **<u>superior to warfarin for stroke and bleeding</u>**
  - ENGAGE-AF: Edoxaban non-inferior to warfarin for stroke, lower bleeding









Key Information on DOACs

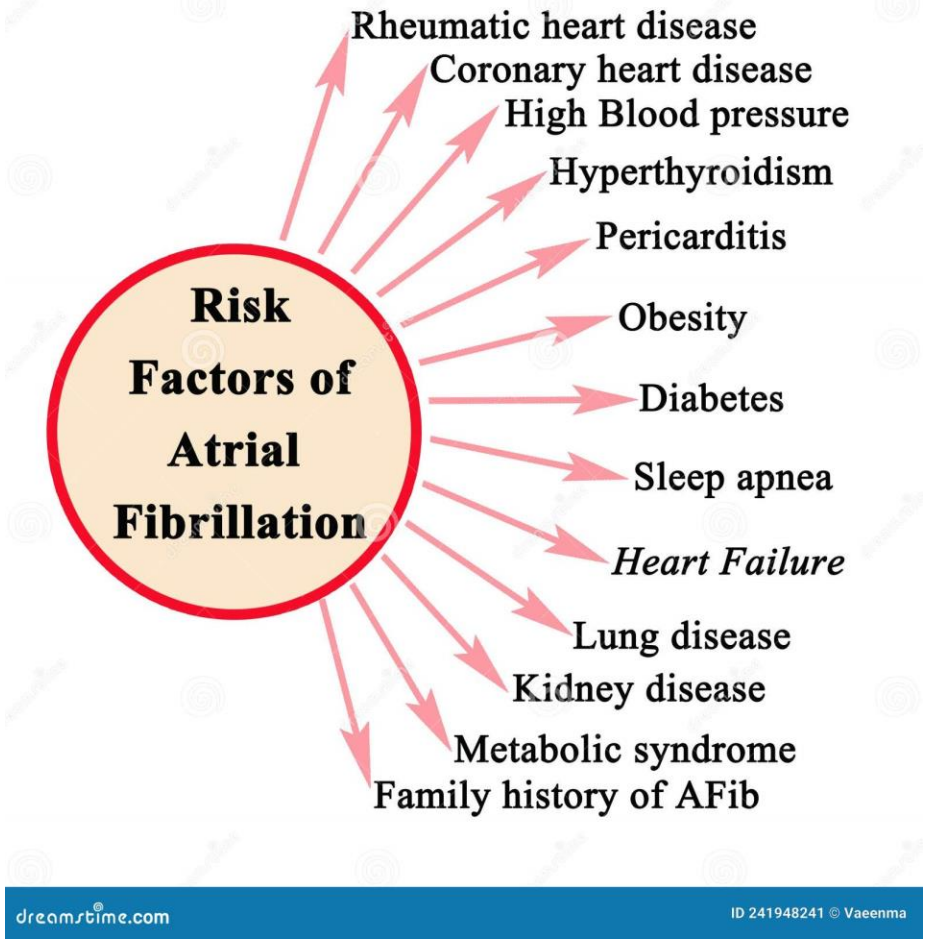
- Renal function requires dose adjustment in most!

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Dosing	150mg BID	20mg daily	5 mg BID	60mg daily
Reduced dosing	75mg BID for CrCl 15-30mL	15mg daily for CrCl 15-50mL	2.5 mg BID if 2/3 +: ≥80yo; ≤ 60kg or Cr ≥1.5	30mg daily for CrCl 15-50mL or ≤ 60kg
Mechanism of action	Direct factor 2a (thombin) inhibitor	Direct factor Xa (thombin) inhibitor	Direct factor Xa (thombin) inhibitor	Direct factor Xa (thombin) inhibitor
Food interactions	none	*Needs to be taken with food*	none	none
Cutoff Cr Cl for use	>30	>15	>15-30	>30
Antidote	Idarucizumab	andexanet alfa	andexanet alfa	andexanet alfa

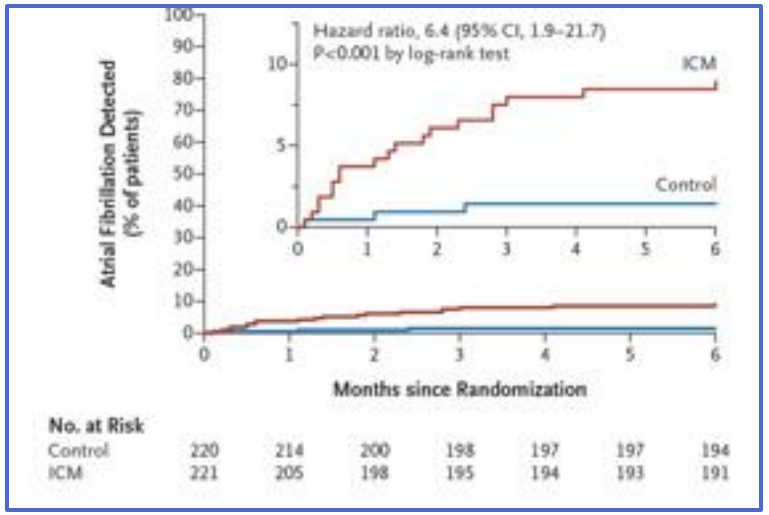
Special Scenarios in Anticoagulation

- Warfarin should be used
  - Valvular AF (mitral stenosis, rheumatic heart disease or severe mitral regurgitation)
  - mechanical valve
  - Advanced renal failure and hemodialysis
  - When DOAC are cost prohibitive

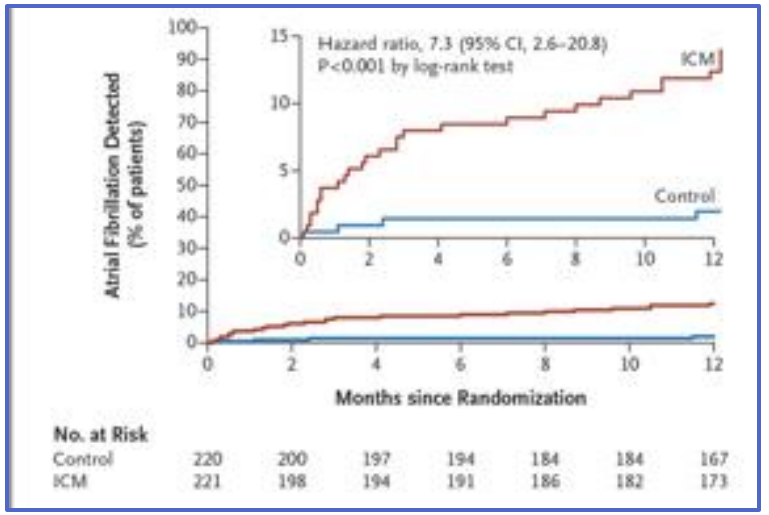
AF Risk Factors



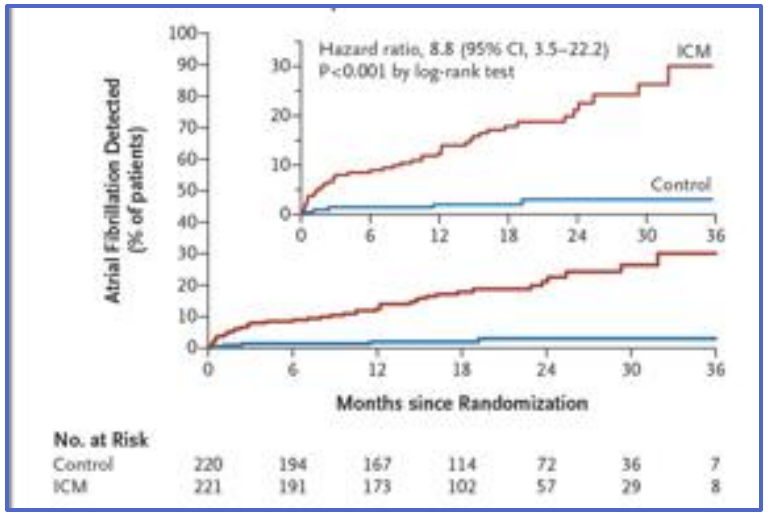
Occult Atrial Fibrillation in Cryptogenic Stroke



8.9% at 6 months



12.4% at 12 months



30% at 3 years

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Sanna T, Diener H-C, et al, 2014 NEJM, 370:2478

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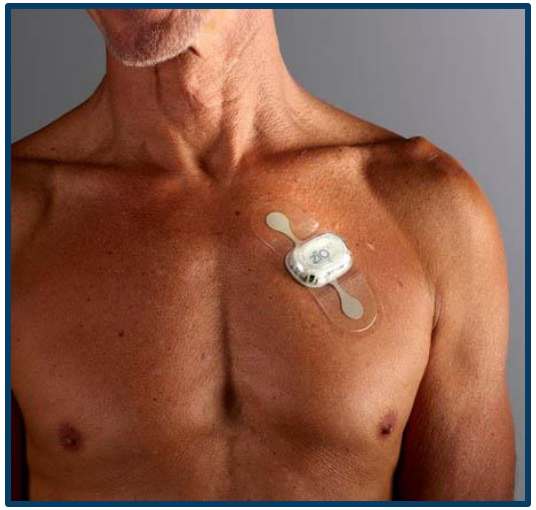
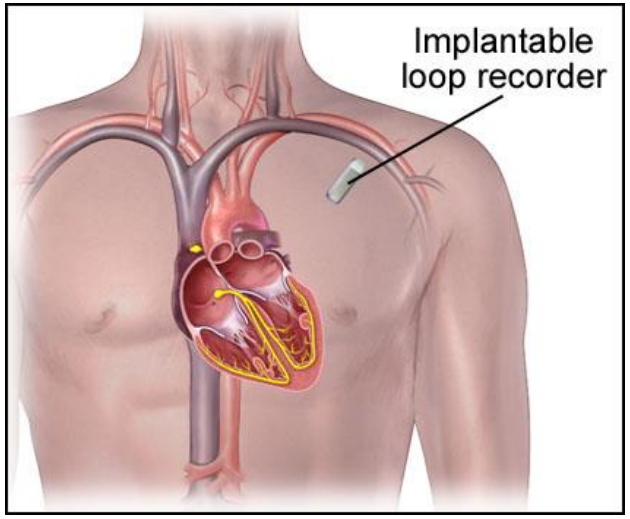
Prolonged Cardiac Monitor



- Zio patch
  - Single report at the end
  - Up to 14 days
- Implantable loop recorder
  - Monthly reporting but can be accessed when needed by provider (syncope, stroke, etc)
  - Up to 3 years



******Subclinical AF >6 mins increased stroke risk → start AC***

SCAI expert consensus statement. CCI 2019
ASSERT Study. NEJM 2012

LAA: Target for Device-Based Prevention

- >90% of thrombi in non-valvular AF originate in the LAA
- LAAO is an alternative for patients who are not good candidate for long-term anticoagulants (but can tolerate short term anticoagulation)

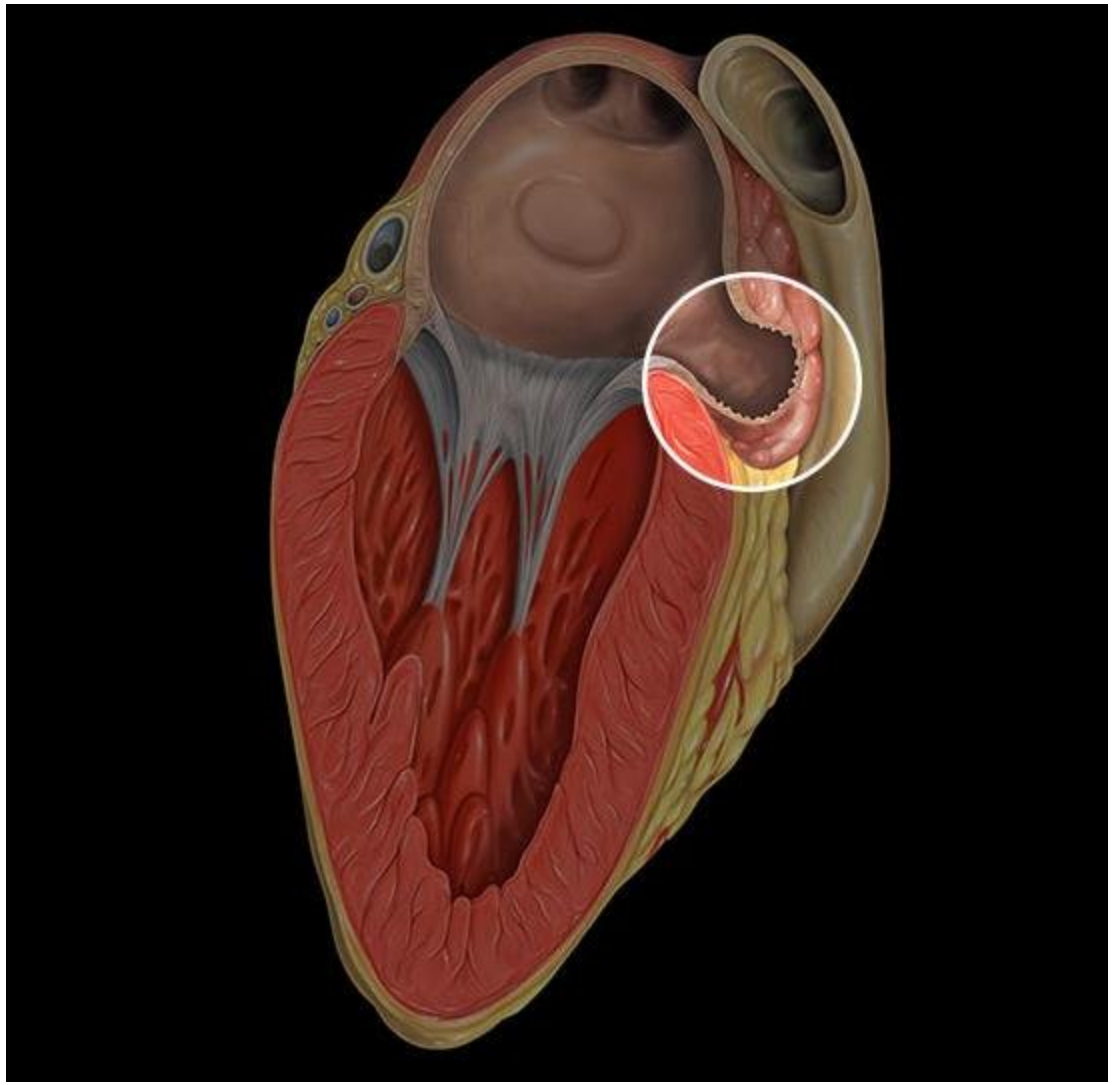
Candidates for LAA Occlusion

- CHA_2DS_2-VASc ≥3 or $CHADS_2$ score ≥2 :

AND rationale for alternate therapy:

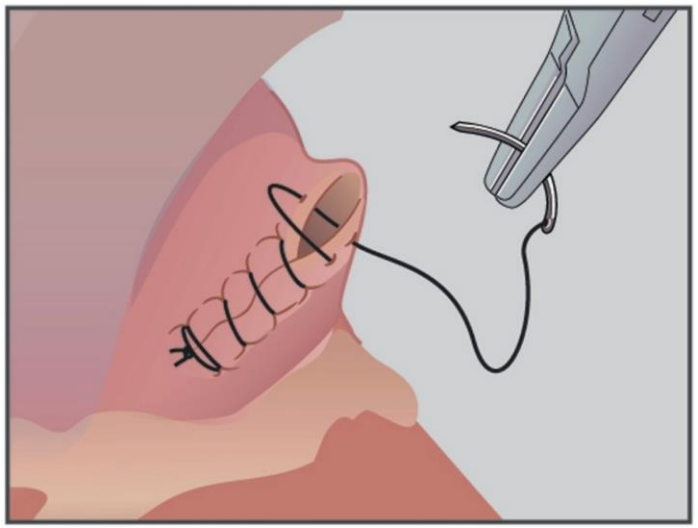
- Major bleeding episode or recurrent bleeding while on OAC
- Poor adherence, difficulty to maintain in a therapeutic range
- High fall risk, frailty
- Recurrent ischemic stroke despite OAC (belt-suspender approach)
- Occupation or lifestyle placing the patient at high risk of major bleeding secondary to trauma

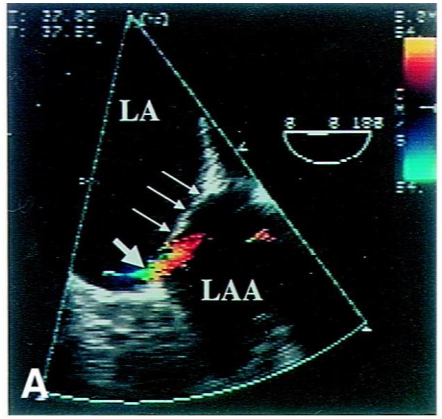
Left Atrial Appendage (LAA) Closure



Surgical Left Atrial Appendage Suture

- Several techniques
  - Endocardial or epicardial ligation
  - Suture excision
  - Stapler exclusion
  - Excision with or without suture reinforcement
  - Snares/suture loops
- Not routinely done
- Very low success closure rate = persistent stroke risk
  - Incomplete exclusion (>1cm neck) in ~60% of patients
- Recanalization is frequent
  - Surgical LAA excision is best
  - Stapler may be better than sutures

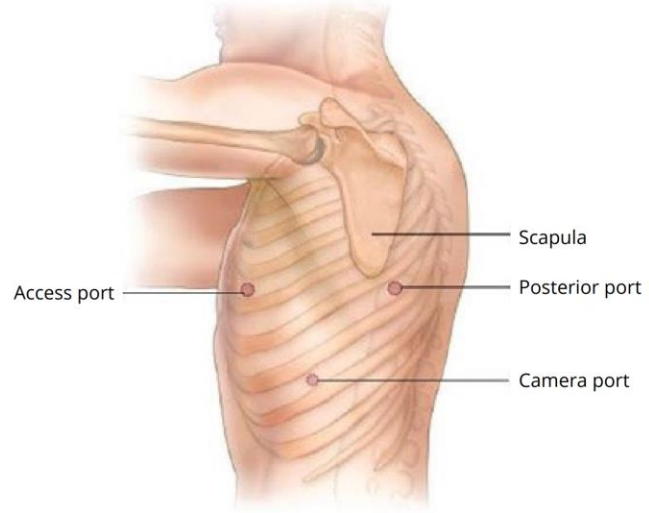




Squiers JJ, Edgerton JR. et al;.2018. J Atr Fibrillation. 2018; 10(5): 1642

AtriClip PRO-V (AtriCure)

- >200,000 devices implanted
- >5 y follow up clinical data (>10y for safety)



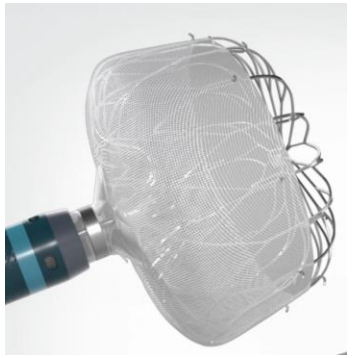
- Epicardial clip → median sternotomy or thoracoscopic access
- 97% successful left atrial appendage (LAA) exclusion
  - No residual leak
  - <1cm residual LAA neck
  - No device migration or complication
  - No intracardiac thrombus, stroke/TIA

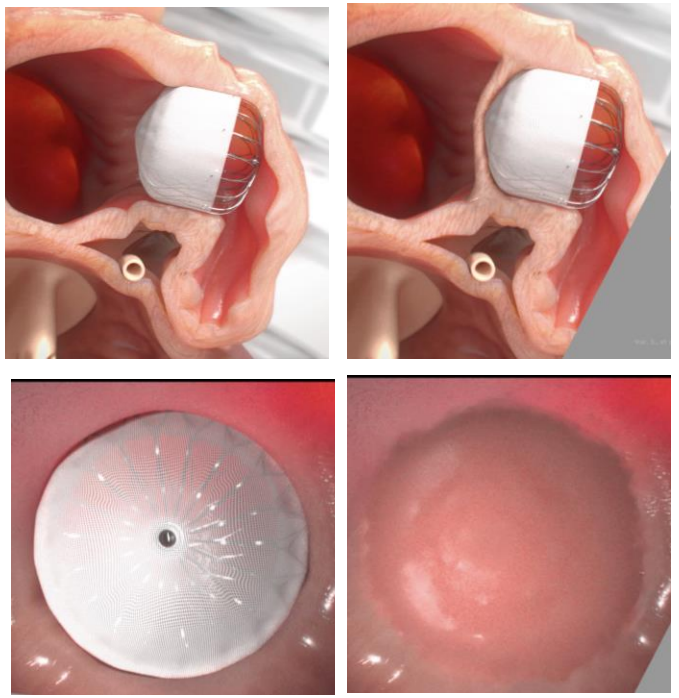
- Leads to electrical isolation of LAA within minutes (less Afib)
- Anticoagulation recommended for ≥ 2 months post

- CE marked and FDA approval (only surgical device)

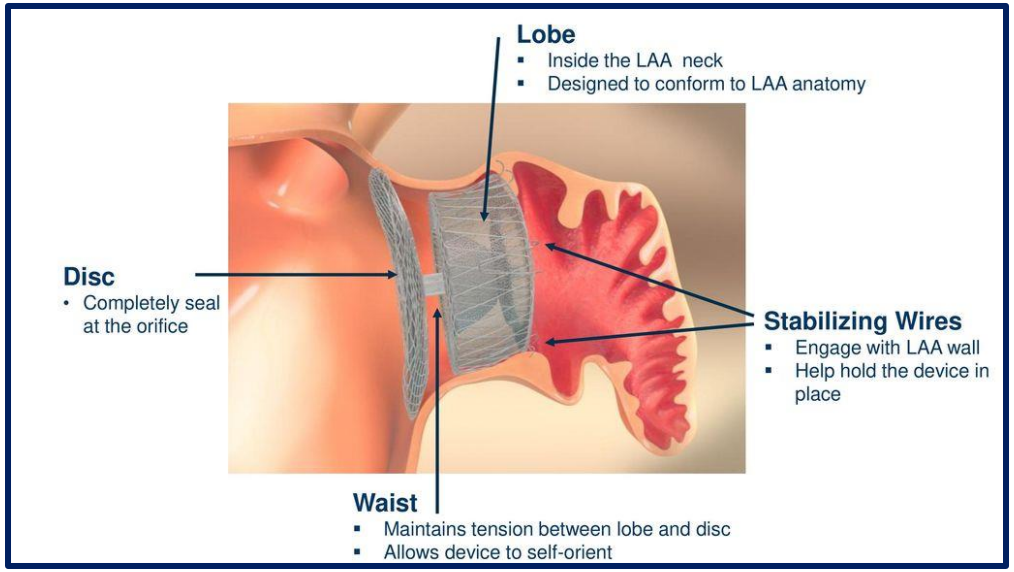
Watchman FLX Device

- FDA approved to reduces the risk of stroke in non-valvular AF patients
- >300,000 Watchman devices implanted (incl. FX)
- ~20 years of clinical trial and real-world experience, including 10 clinical trials
- Nitinol frame with Polyethylene Terephthalate (PET)
- Fits most anatomy
  - 5 sizes (20-35mm)
  - Full recapture and reposition
  - >97% success rate
  - Very low adverse event rates (<1%)
  - Excellent seal/closure of the LAA
- Endothelialization at 45 days*
  - 96.2% off anticoagulation at 45 days
- MR Conditional device

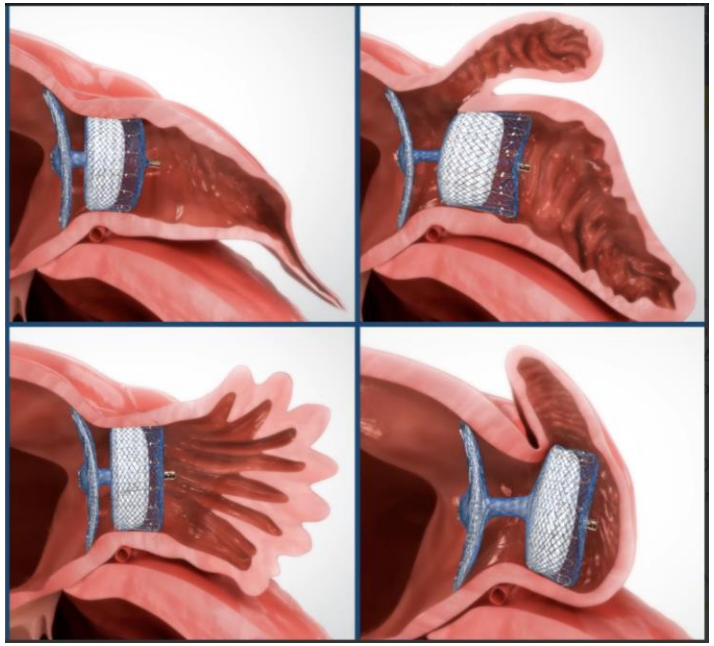




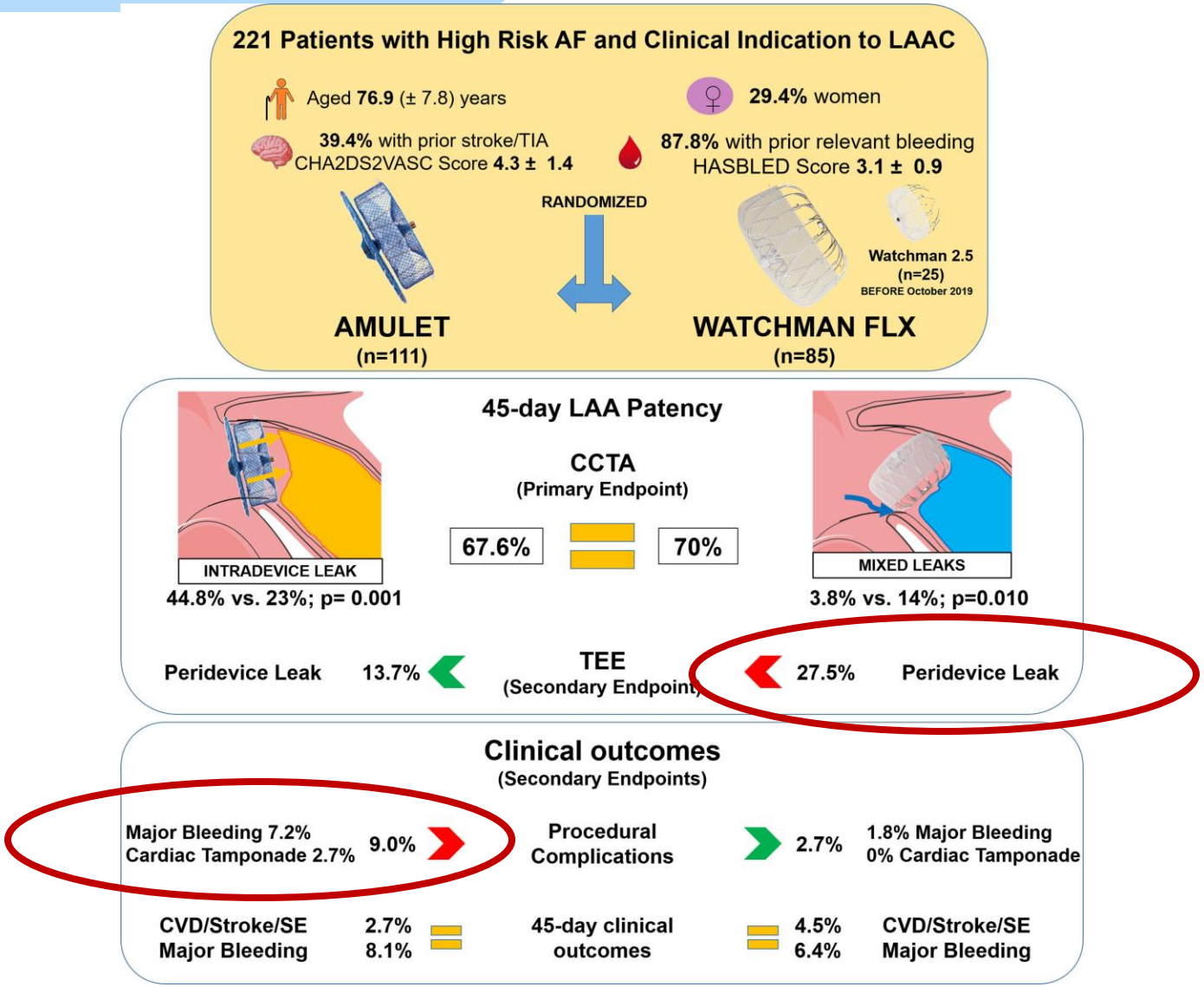
Amplatzer™ Amulet™ Device



- FDA approved to reduces the risk of stroke in non-valvular AF patients **who are at high risk of bleeding**
- Second generation Amplatzer™ LAA Occluder
- Self-expanding nitinol plug
  - Lobe and disc, connected by a central waist
- Proximal placement in LAA allows use in all shapes
- 8 sizes (16 mm - 34 mm)
- Recapturable and repositionable
- Slightly higher peri-procedural complications (pericardial effusion) compared to Watchman FLX
- MR conditional device



Watchman FLX™ vs Amulet Device



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Galea R et al. SWISS APERO Randomized Clinical Trial. Circulation. 2022

Rate vs Rhythm Control

- Natural history of AF: AF presents with paroxysmal episodes → transition to persistent AF → structural and electrical remodeling of the atria → AF begetting AF, resulting in persistent AF.

- Rhythm control = maintenance in SINUS rhythm
  - Medications (flecainide, dofetilide, amiodarone)
  - Catheter AF ablation
  - Surgical MAZE procedure

- Rhythm control should be offered when AF is first diagnosed
- Rhythm control is preferred in patient with HF and most patients <70 years of age
  - Ablation reduced mortality/hospitalization in HF, but no significant stroke reduction

- Rhythm control doesn't eliminate stroke risk — anticoagulation still needed

CABANA trial. EAST-AFNET 4 trial. CASTLE-AF study.

Take Home Points

- AF-related stroke can be significantly lowered with OAC
- DOACs are the mainstay unless contraindicated
- LAA occlusion offers non-pharmacologic alternative for select patients
- Stroke neurologists are pivotal in detection and decision-making