Rhode Island STROKE SYMPOSIUM

THE WARREN ALPERT Medical School
BROWN UNIVERSITY

Cardiac Monitoring After Stroke: Who and How Long

Farhan Khan
The Warren Alpert Medical School

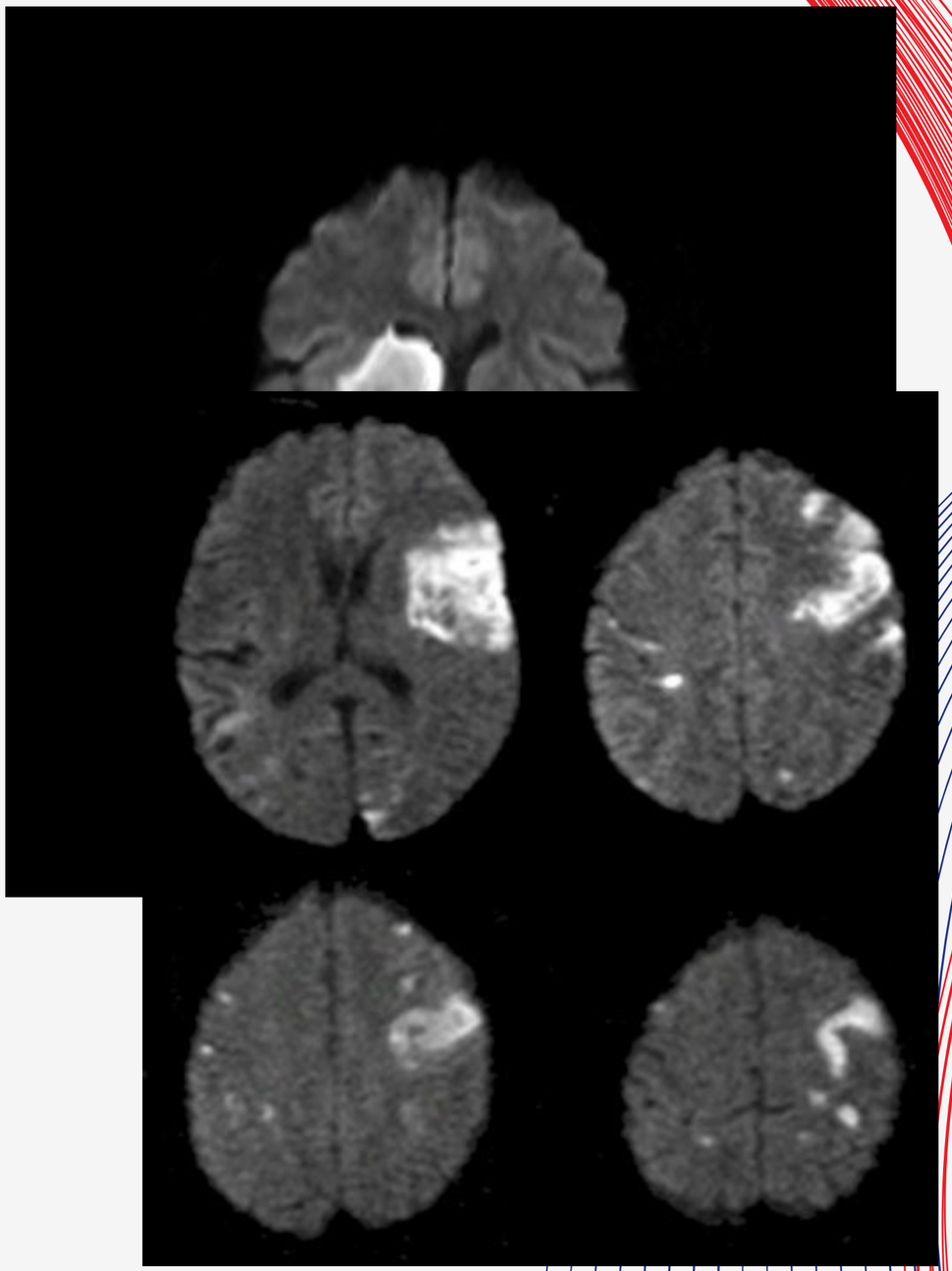
DISCLOSURE

- No relevant financial relationships to disclose>
- My talk will not include any off-label discussion

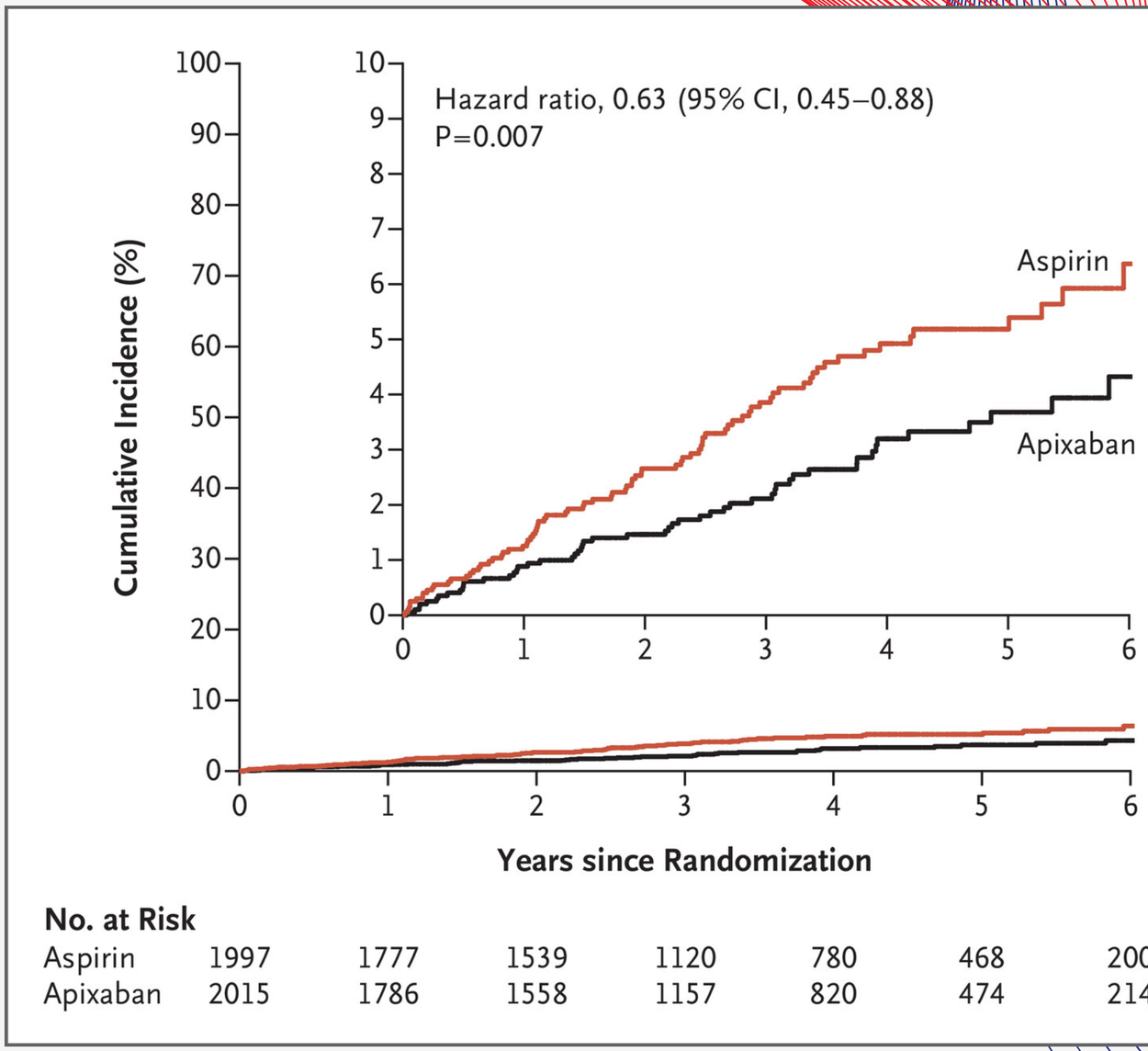
- Cardio-embolism account for 25-30%
  - >50% caused by atrial fibrillation
  - Intracardiac thrombus

Pattern of ischemic stroke

  - Cortical/subcortical
  - Striato-capsular due to stem occlusion
  - Silent strokes
- Associated with high recurrence and severity
- Anticoagulation is associated with
  - ~65% decrease in recurrent stroke risk(AVVEROES)
  - Dec morbidity and mortality

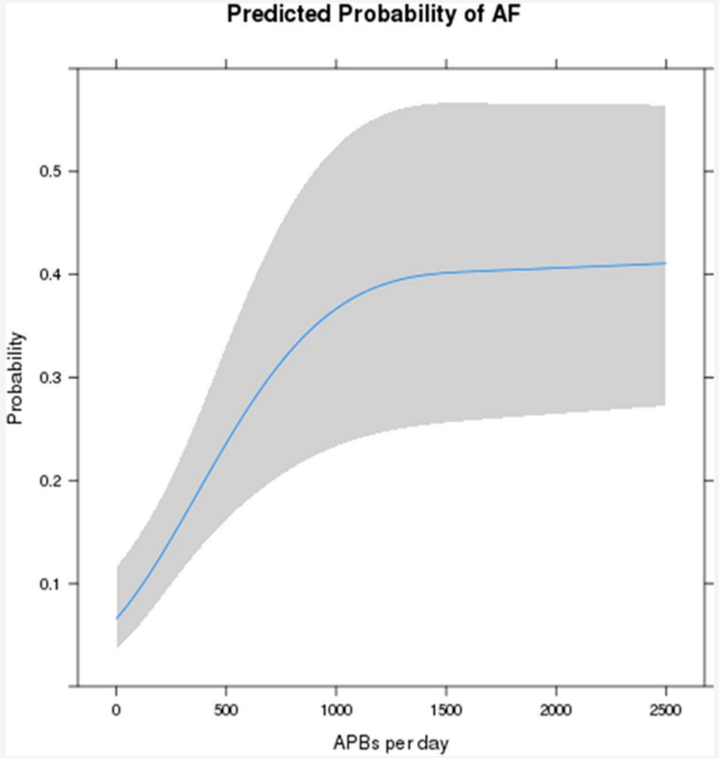


- Nearly 25% have known AF prior to stroke
- Subclinical AF
  - Short lasting
  - Asymptomatic
  - Not diagnosed by standard clinical means(EKG)
- Benefit of anticoagulation for SC AF
  - ATRESIA trial
  - 0.78% vs 1.24%(HR 0.63; 95% CI 0.45- 0.88)
  - 49% reduction in fatal strokes
  - Lower rates of recurrent stroke/systemic embolism than clinical AF

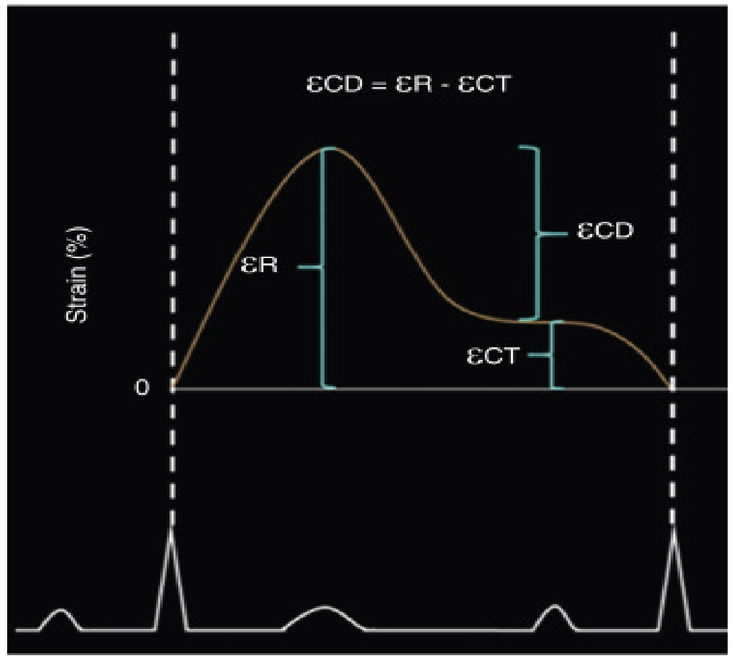


Whom to Monitor After A Stroke

- Stroke etiology
  - Wedge shaped cortical/subcortical pattern
  - All ESUS population
- Older age, ≥ 75 years
  - ARR 1.5% under 55 years
- Higher atrial premature beats burden
  - count(629beats/24h) in AF vs 45 beats /24 hour
- Atrial tachycardia ≥20 beats(HR 2.7; 95% CI 1.2-6)

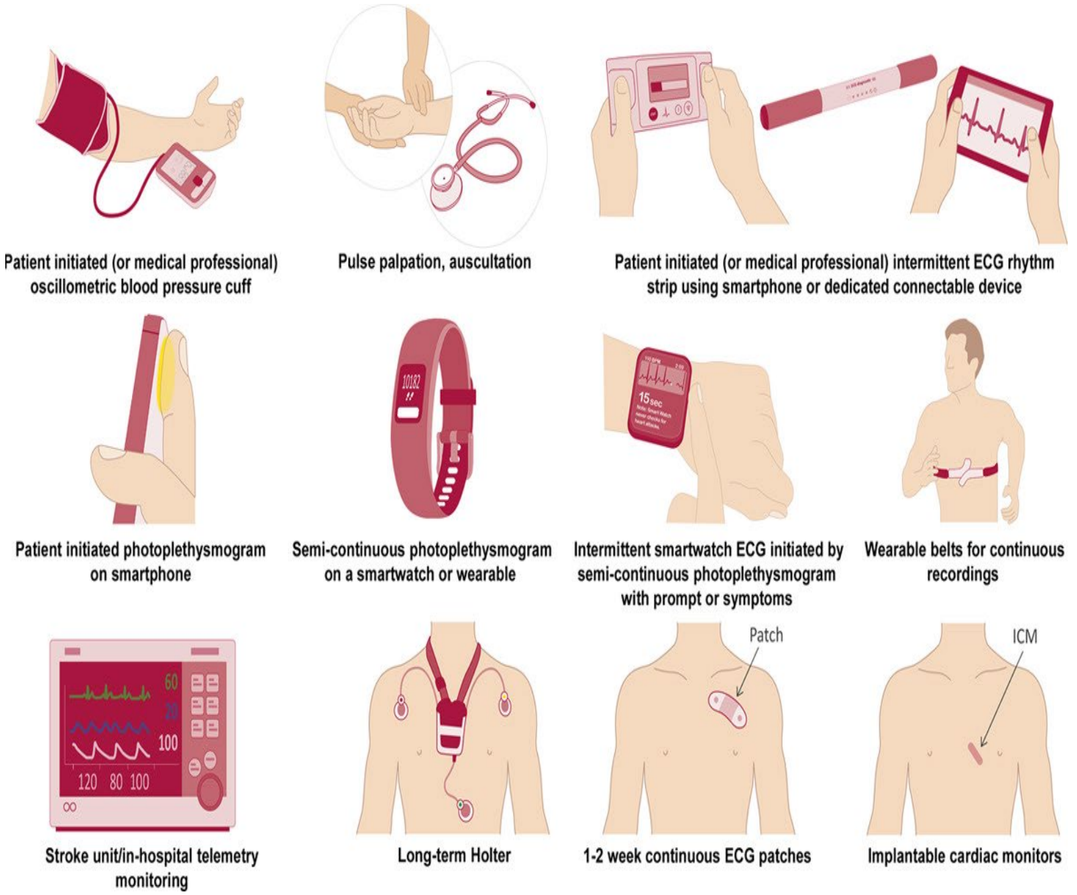


– Cardiac biomarkers(atrial stretch)
  - NT-proBNP >400 pg/mL(aOR 6.17,;95% CI 4.31–8.84)
  - BNP >100(aOR 4.49; 95% CI 3.26–6.2)
– Cardiac morphology
  - Left atrial size >46 mm(HR 3.6; 95% CI 1.6-8.4)
  - LAVI greater than 28 mL/m^2
  - Low atrial strain
  - Mitral valve disease(rheumatic, MR)
  - Echocardiographic contrast or solid thrombi

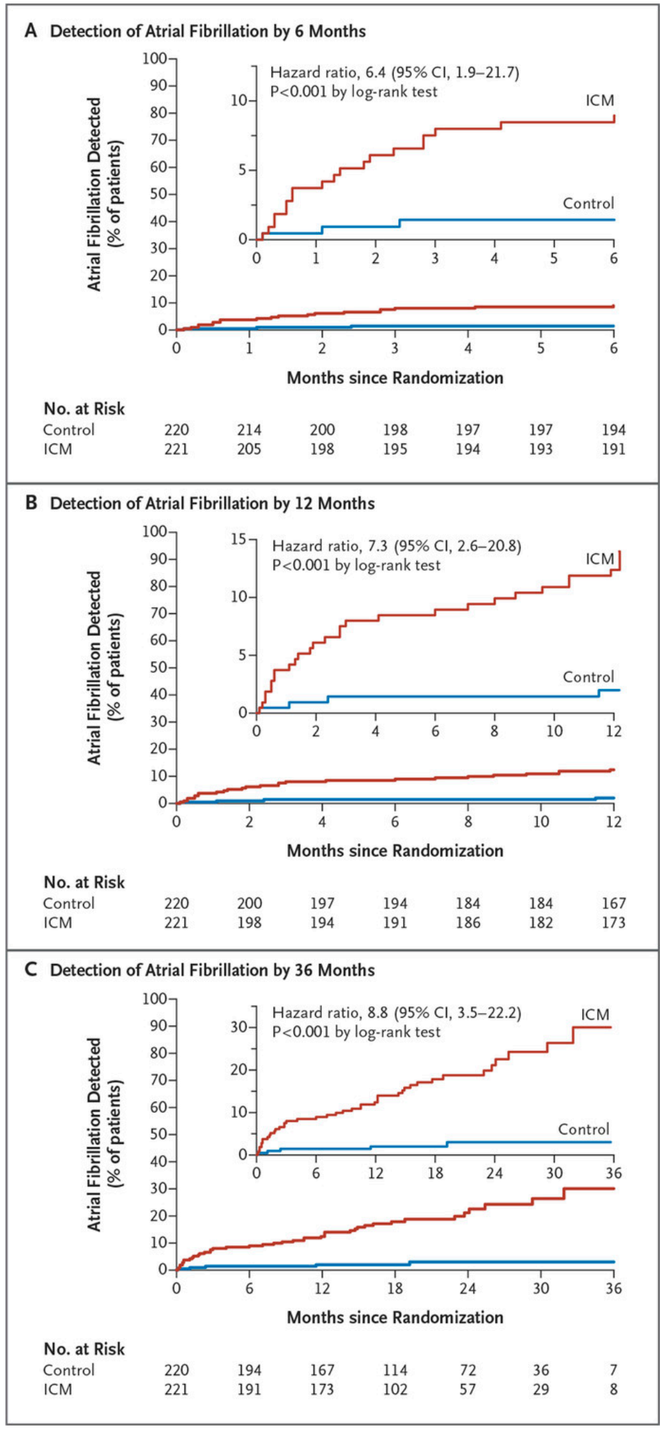


Methods of Monitoring

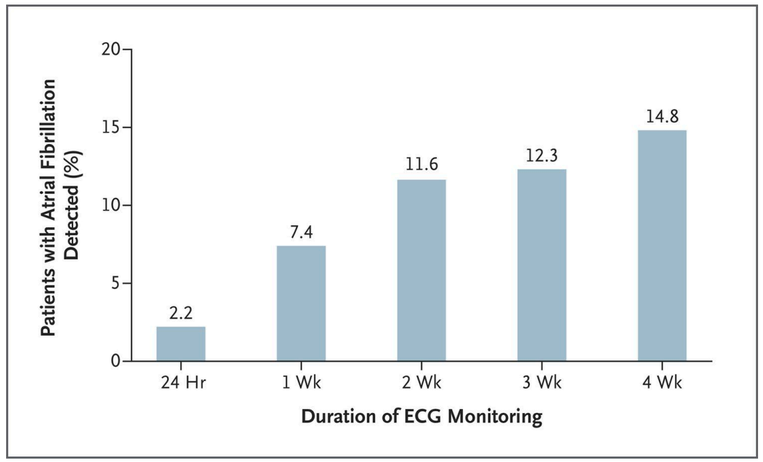
- EKG
  - In office EKGs
  - Holter(24-48 hours)
  - Event monitor(up to 4 weeks)
- Smartwatches and Fitness trackers
  - Apple watch, Fitbit, Garmin
- Implantable devices
  - Loop recorders
  - Pacemakers and ICDs



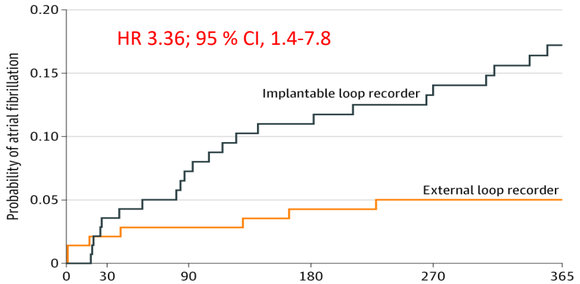
- Detection with 12 ECG
  - Between 2%-5%
- 24-hour Holter
  - 2% to 6%
- CRYSTAL-AF at 6 months
  - 9% vs 1.4%(HR, 6.4; 95% confidence interval [CI], 1.9 to 21.7; P<0.001)
  - Median time 41 days vs 32 days
  - Asymptomatic in 14/19 in ICM and 1/3 in control
- At 12 months
  - 12.4% vs 2 %(HR, 7.3; 95% CI, 2.6 to 20.8; P<0.001)
- At 36 months
  - 30% vs 3%(***)

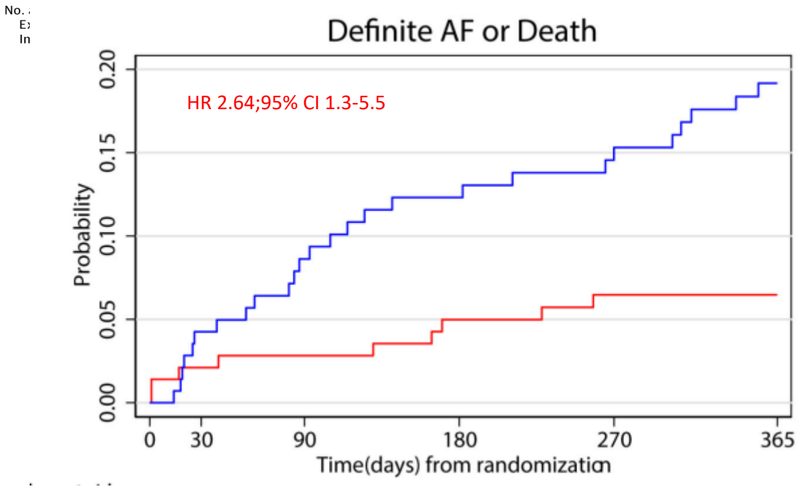


- EMBRACE trial
  - 30-day external loop recorder vs 24-hour Holter
  - Detection rates
    - 16.1% vs 3.2%(95% CI 8.0-17.6)



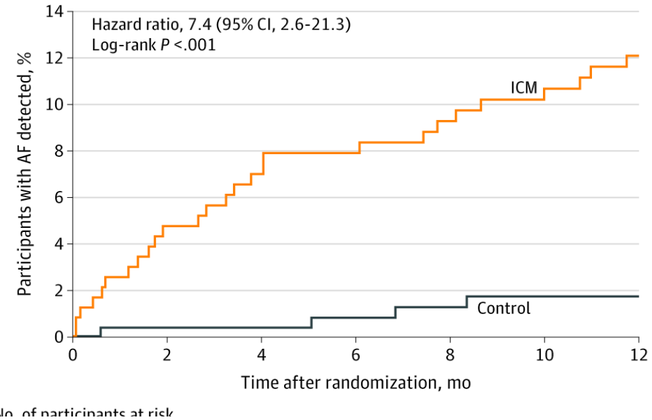
- PER DIEM trial
  - ICM vs external heart monitor
    - 15.3% vs 4.7%(absolute difference 10.7%, 95% CI 4.0-17.3%)
    - Definite AF(any duration) or death within 12mo
      - HR 2.64; 95% CI 1.27-5.49,p=0.009
    - AF lasting ≥ 2minutes
      - HR 3.36; 95 % CI, 1.4-7.8, p=0.005

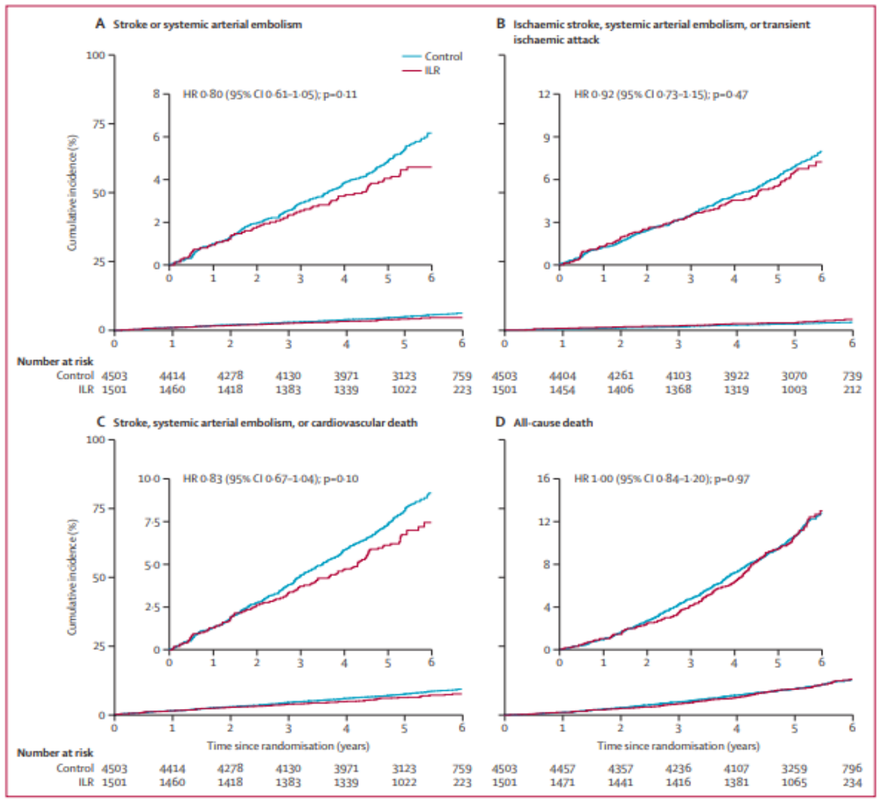




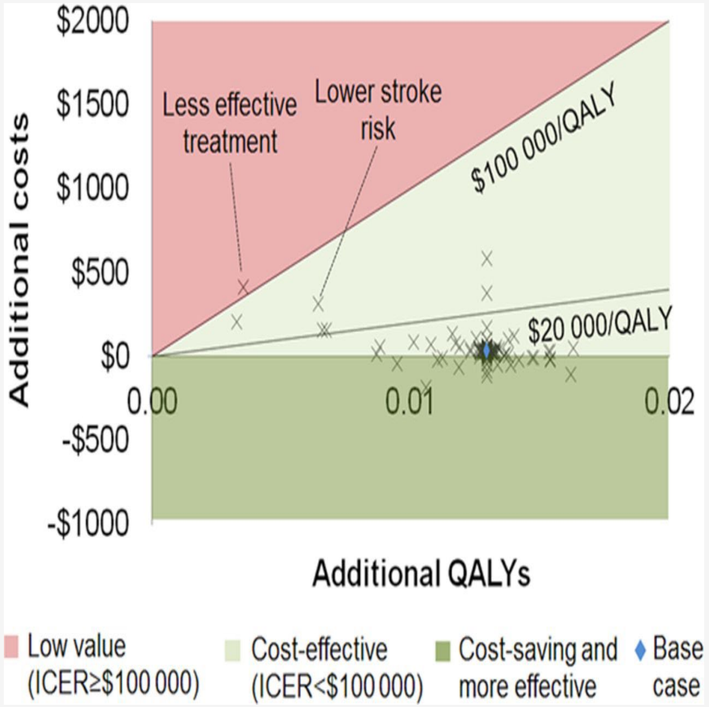
- STROKE-AF
  - Subclinical AF in known stroke mechanism(LAA or SVID)
    - Overall, 12.1 vs. 1.8 %, ARD 10.3%, HR 7.4, 95% CI 2.6-21.3
    - At 6 mos, 7.9% vs. 0.8%(HR, 9.9; 95% CI, 2.3-43.5)
    - At 3 years, 21% vs 2.4%(HR 10;95% CI, 4-25)
    - Detection rate is low at 30 days(2.6%)

- Complications
  - Skin infection(less than 1%)
  - Skin irritation from adhesives(less than 2%)





- Digital Devices
  - Fitbit Heart Study(PPV 98%)
  - Apple Heart Study(PPV 78 %)
  - Huawei Heart Study(PPV 87%)
- Overall sensitivities are low
- Health Economic Assessments
  - 7-day vs 24 hour(ICER $13,000/QALY)
  - 30-day monitoring is cost effective than 24 hours(ICER $2000/QALY)
  - ICM vs standard of care monitoring(ICER of £17,175/QALY)



Take Away Points

- Longer monitoring is associated
  - Increased detection of subclinical AF
- 30-day monitoring is reasonable for ESUS population
- Lower rates of recurrent stroke with SC AF
- Longer monitoring is considered(>30days)
  - For older individuals(>75 yrs)
  - Inc. burden of PACs/Atrial tachycardia
  - LA enlargement
  - Elevated biomarkers(pro-BNP>400)