Montenegro rhythm

program i vizija

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Odjeljenje za poremećaje ritma i elektrofiziologiju srca KCCG

Medicinski fakultet

Udruženje za poremećaje srčanog ritma Crne Gore

MontHRA

MONTENEGRIN HEART RHYTHM ASSOCIATION

Udruženje za poremećaje srčanog ritma Crne Gore

Misija

- Put zdravog tijela u zdravom duhu
- Aktivna promocija zdravih stilova života
- Razvijanje kulture održavanja zdravog srca
- Ukazivanje na značaj redovnih sistematskih odnosno preventivnih i kontrolnih kardioloških pregleda
- Edukacija šire javnosti pacijenata, njihovih porodica, ljekara i drugih ostalih zdravstvenih radnika o ranom prepoznavanju simptoma oboljenja srca
- Ukazivanje na značaj prevencije, rane dijagnostike i blagovremenog, savremenog liječenja bolesti srca

Udruženje za poremećaje srčanog ritma Crne Gore

Misija

- Naučno istraživački rad
- Izrada, priprema i sprovođenje projekata vezanih za srčane aritmije i druge kardiovaskularne bolesti
- Organiziranje tribina, stručnih predavanja, seminara, konferencija i ostalih oblika edukacije i informisanja o kardiovaskularnim oboljenjima
- Organiziranje manifestacija povodom obilježavanja Svjetskog dana srca, Nedjelje atrijalne fibrilacije i sličnih događaja
- Saradnja sa Institucijama iz okruženja ili drugih regiona

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1. SIMPOZIJUM

ZA POREMEĆAJE SRČANOG RITMA I SRČANU SLABOST

MONTENEGRO RHYTHM

12-14. septembar 2025.

Hotel Avala

Budva

Atrijalna fibrilacija

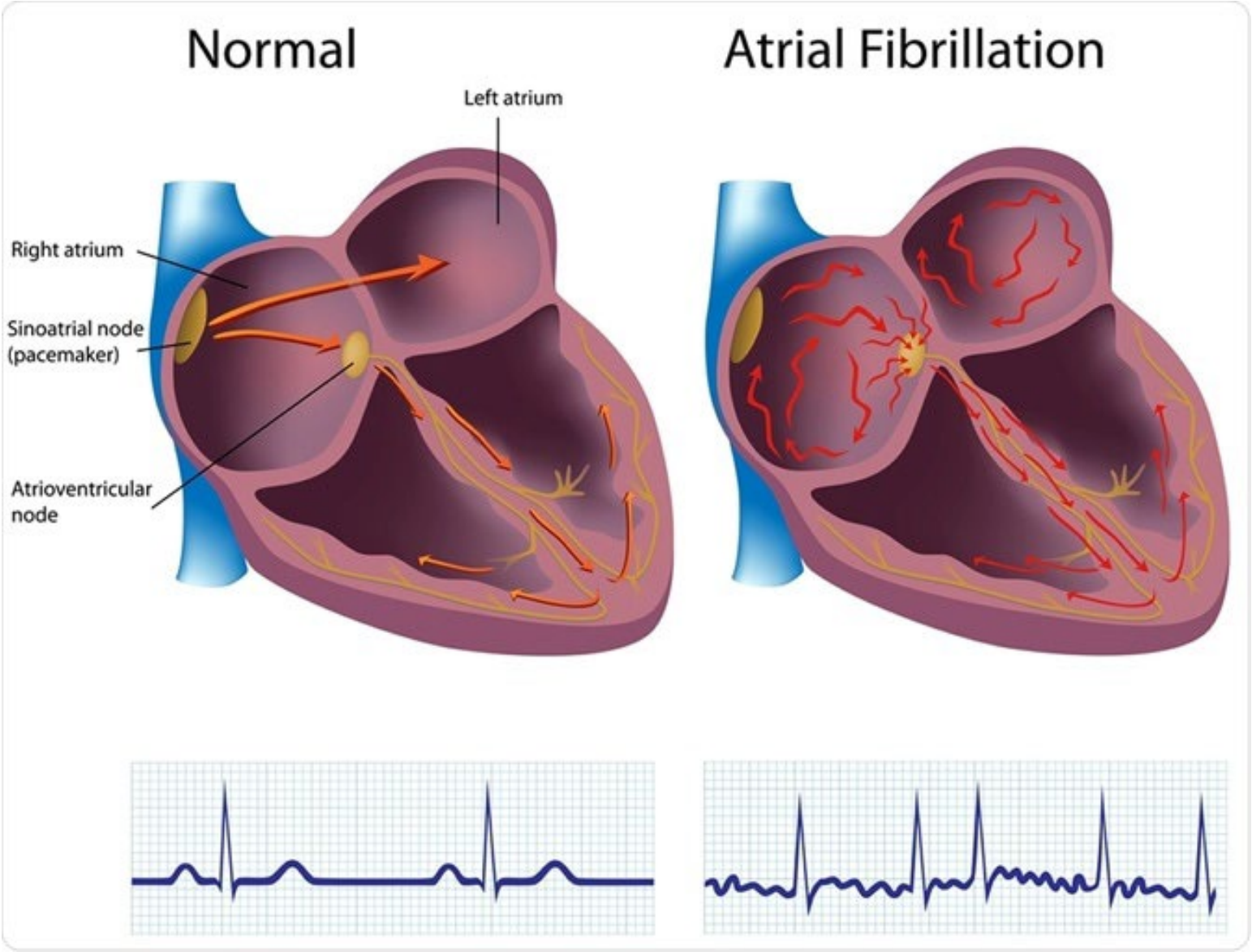
- Jedno od najčešćih oboljenja srca i hospitalizacija
- Veliko opterećenje za sve zdravstvene službe
- Očekuje se udvostručvanje prevalence kao posledica:

  Starenja stanovništva

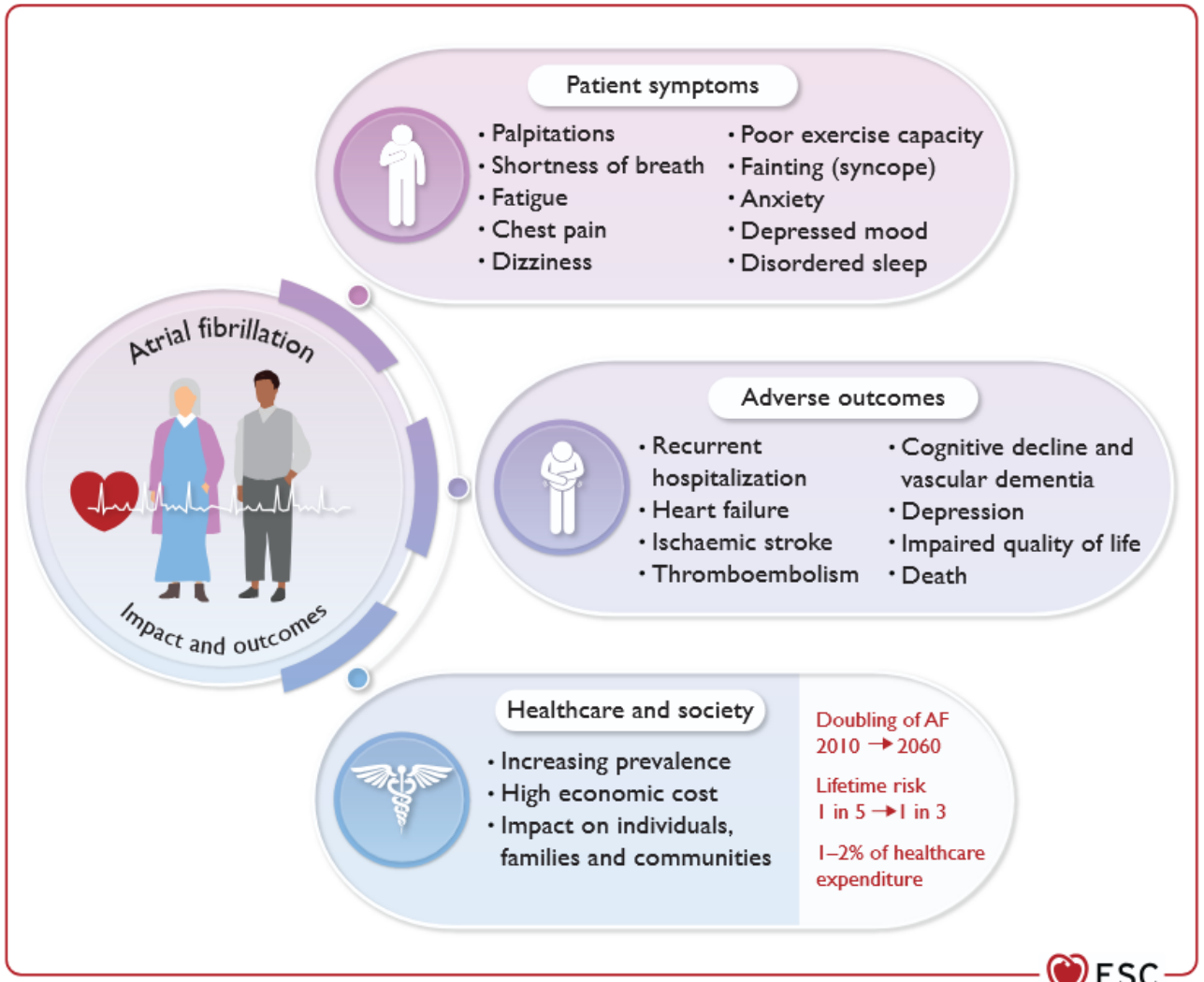
  Sve učestalijih komorbiditeta

  Poboljšanje znanja o atrijalnoj fibrilaciji

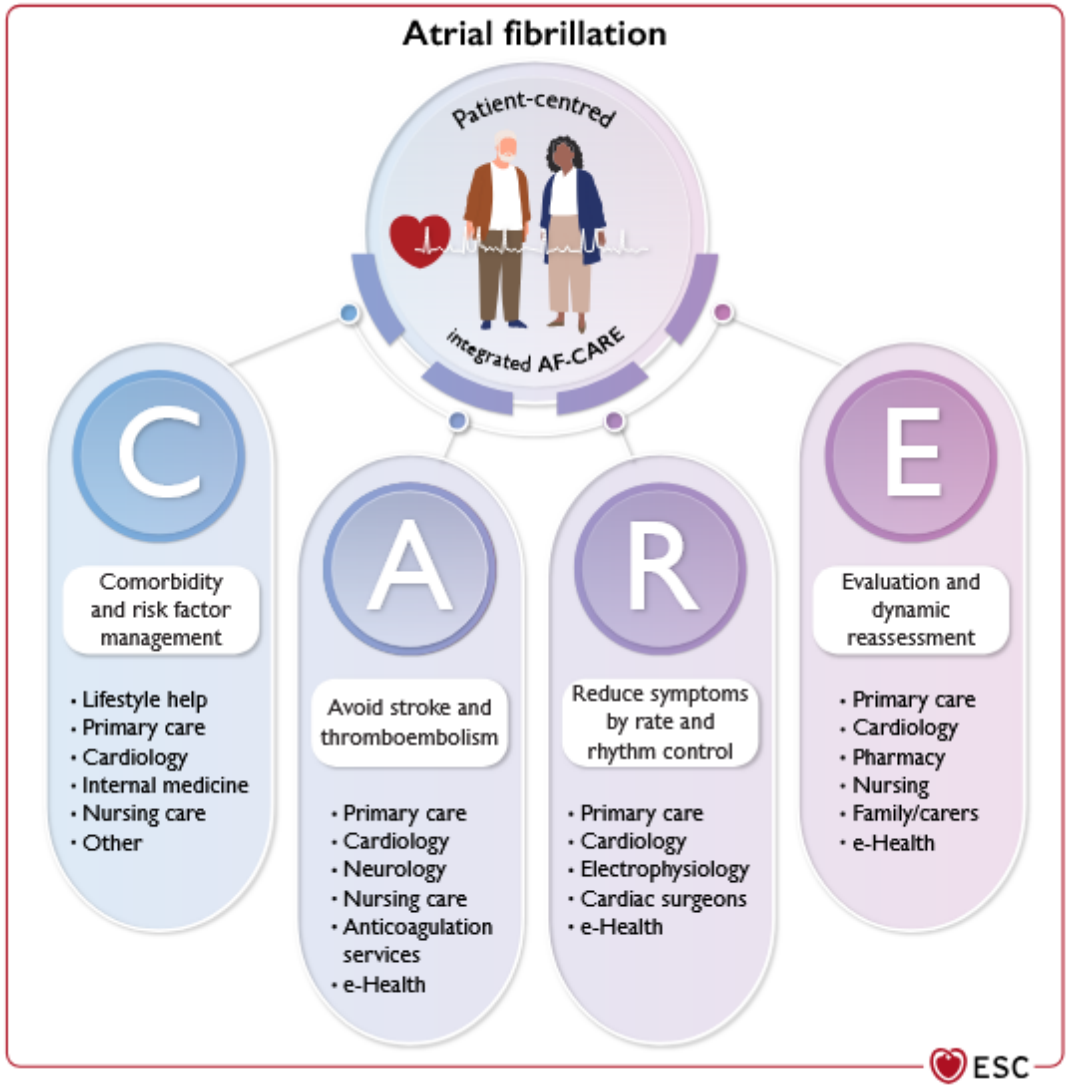
  Pristupačnije nove tehnologije za detekciju


Normal
Atrial Fibrillation
Left atrium
Right atrium
Sinoatrial node
(pacemaker)
Atrioventricular
node

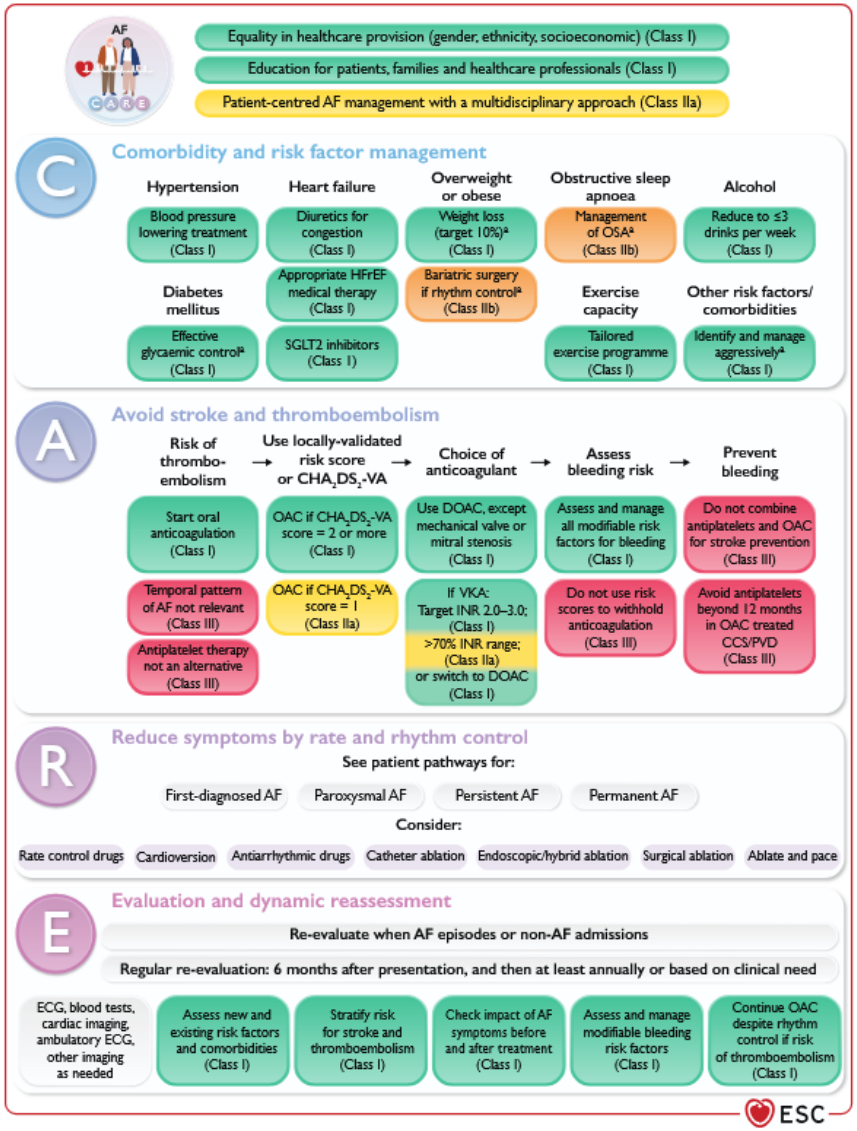
Impacts and outcomes associated with clinical AF



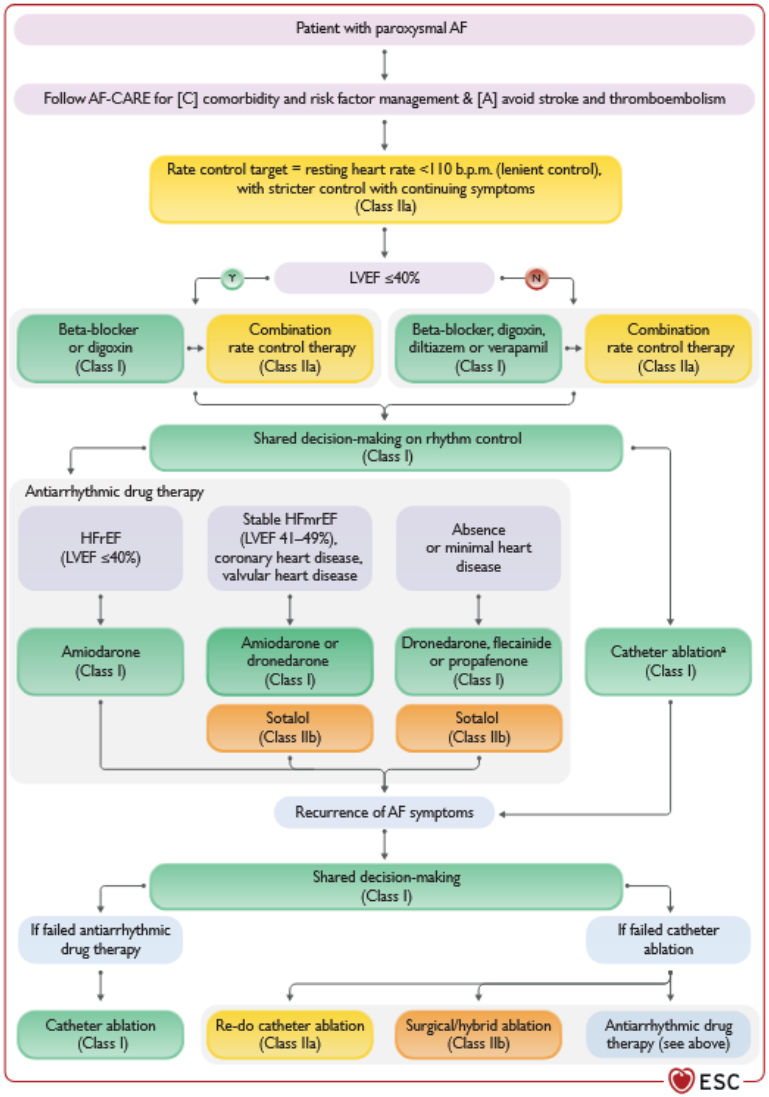
Multidisciplinary approach to AF management



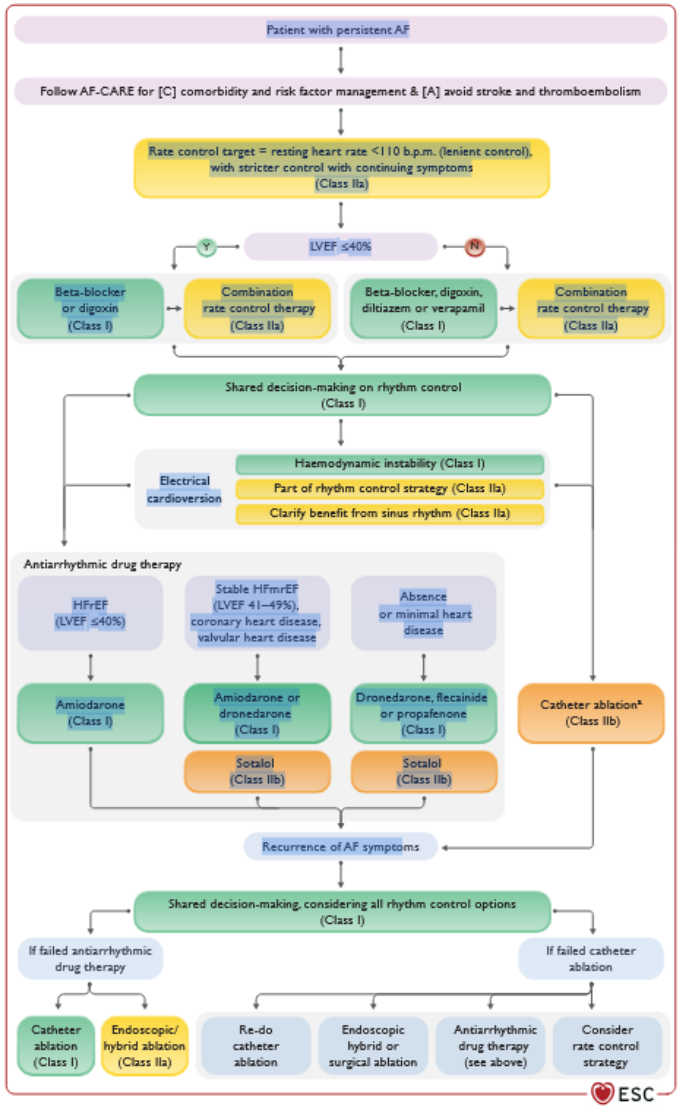
Patient pathway for AF-CARE



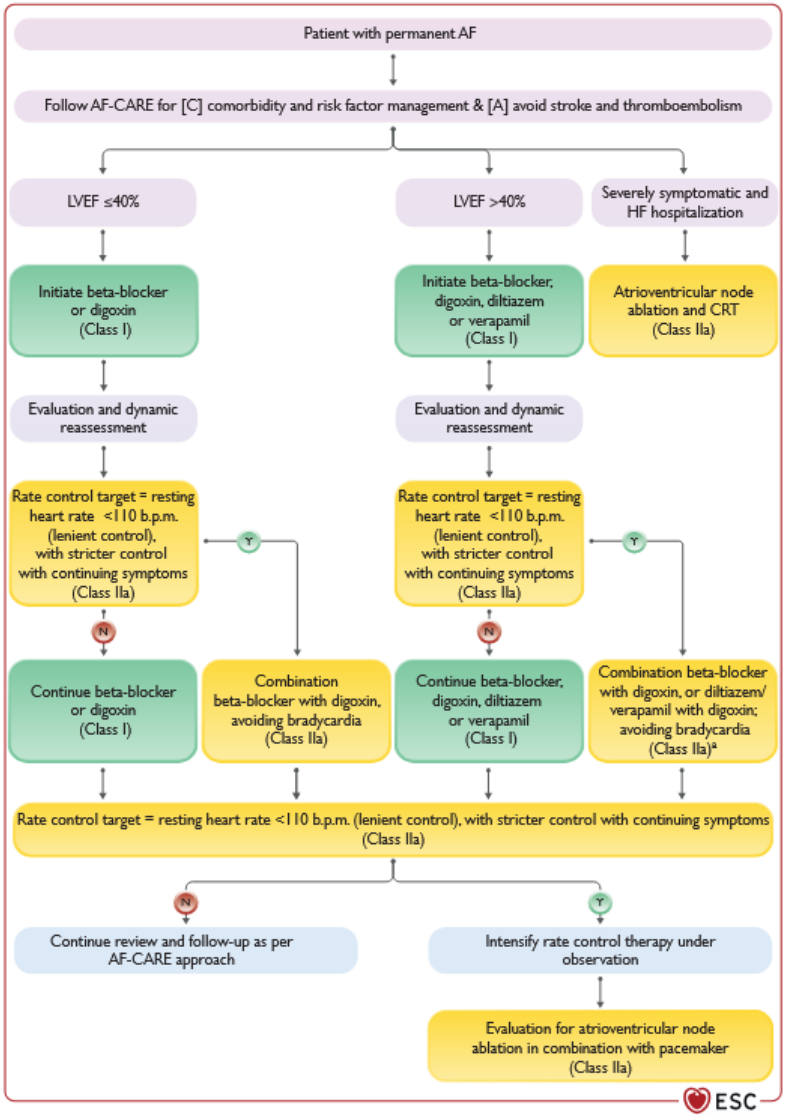
Pathways for patients with paroxismal atrial fibrillation



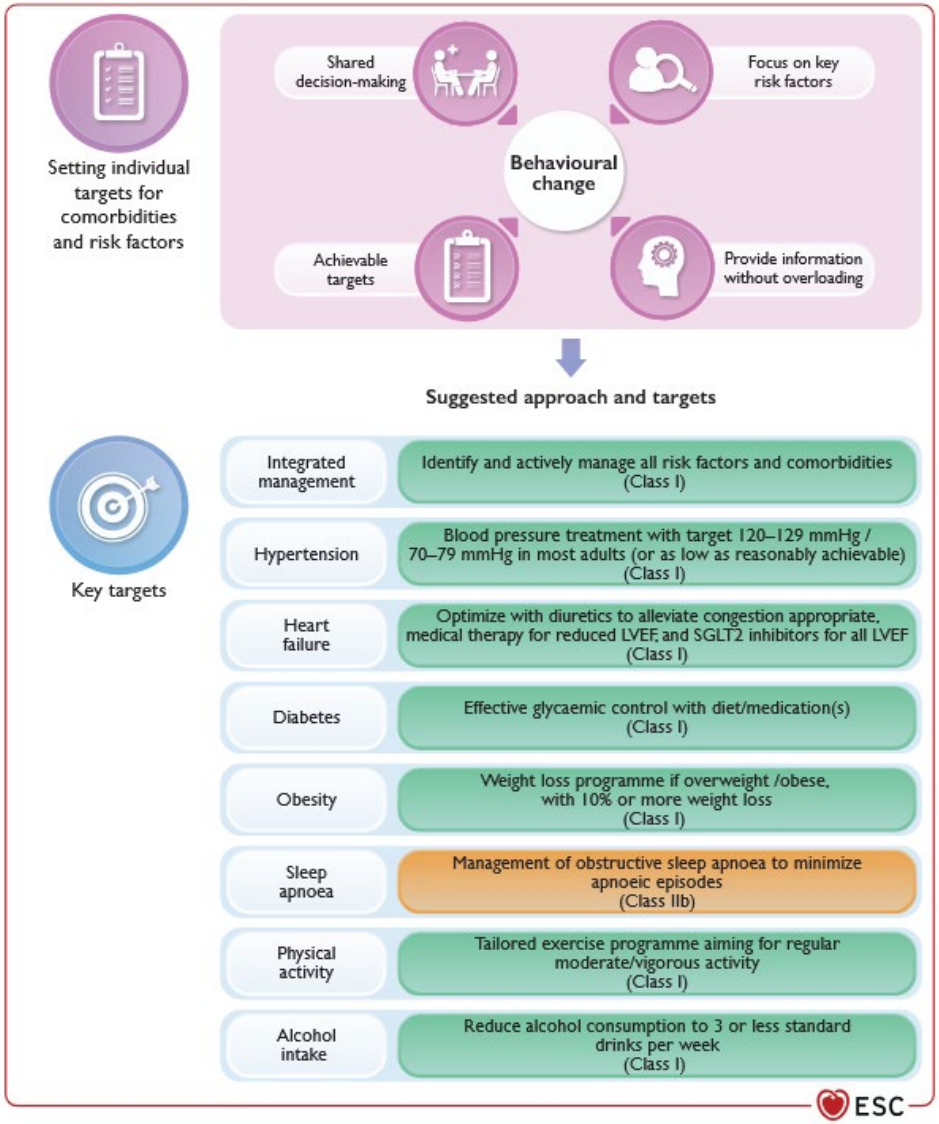
Pathways for patients with persistent atrial fibrillation



Pathways for patients with permanent atrial fibrillation



Management of key comorbidities to reduce AF recurrence

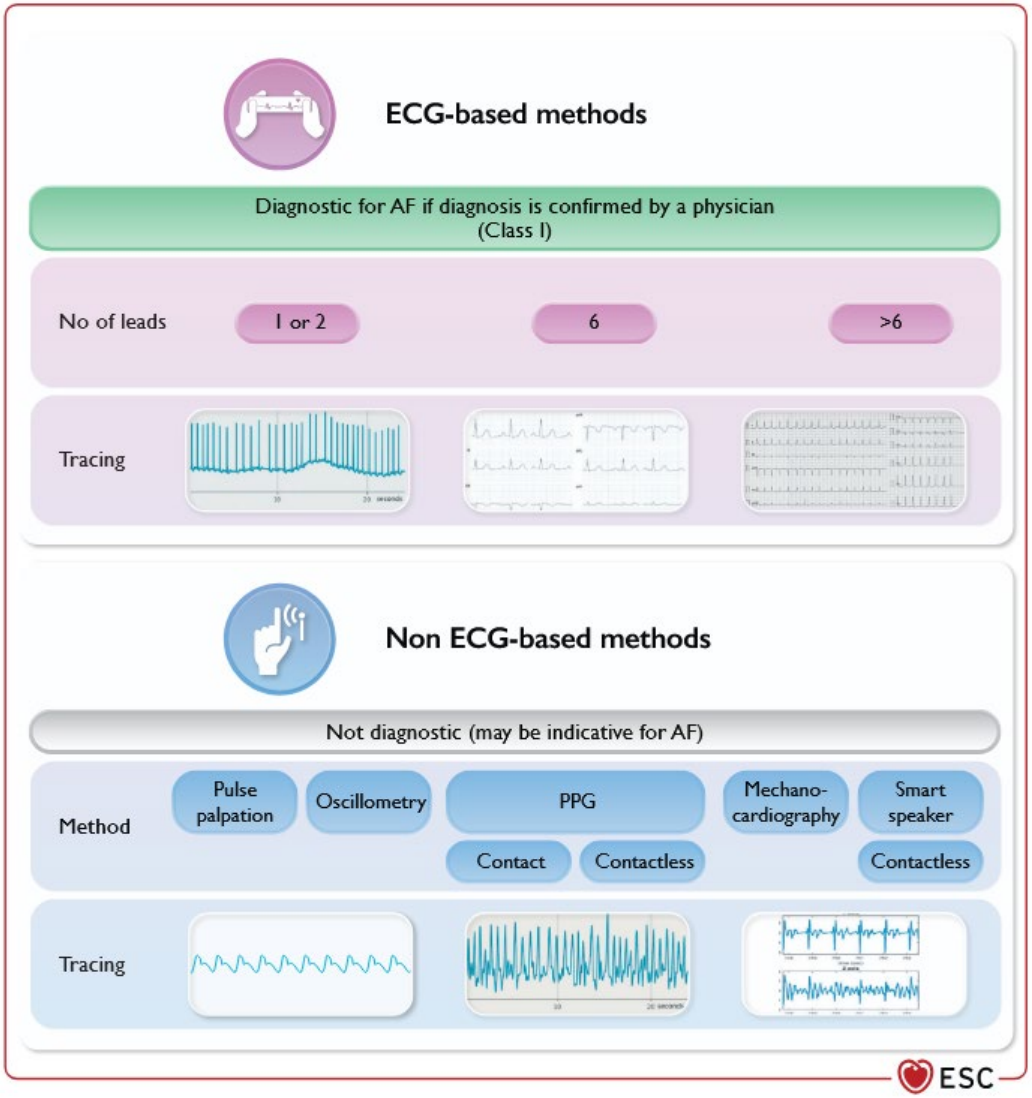


Relevance of echocardiography in the AF-CARE pathway

AF-CARE pathway	Objective for imaging	Assessment	Example of pathology
C Comorbidity and risk factor management	To identify comorbidities which are associated with recurrence and progression of AF	Left ventricular ejection fraction, wall motion abnormalities, diastolic indices, right ventricular function and left ventricular hypertrophy to determine subtype and aetiology of heart failure Detection of pericardial fluid or pericardial disease Detection of valvular disease	Cardiac amyloid 
A Avoid stroke and thromboembolism	To determine stroke risk, choice of anticoagulant drug and ensure safety for cardioversion	Detection of heart failure for CHA_2DS_2-VA score Detection of moderate-severe mitral stenosis to determine choice of anticoagulation Transoesophageal echocardiogram for left atrial appendage assessment to exclude thrombus prior to cardioversion	Clot in LAA 
R Reduce symptoms by rate and rhythm control	To determine optimal choice of rate and rhythm control strategy and likely success of ablation	Left ventricular ejection fraction to determine choice of rate control Severity of valvular disease to determine choice of rhythm control Left ventricular size and function to determine choice of rhythm control Left atrial size and function to determine risk of arrhythmia recurrence following ablation	Severe LV impairment 
E Evaluation and dynamic reassessment	To detect changes in the patient's heart structure and function which would affect their management plan	Reassess known valve disease for increase in severity Reassess left ventricular size and function if there is a change in the patient's clinical status or symptoms	Mixed mitral valve disease 

ESC

Non-invasive diagnostic methods for AF screening



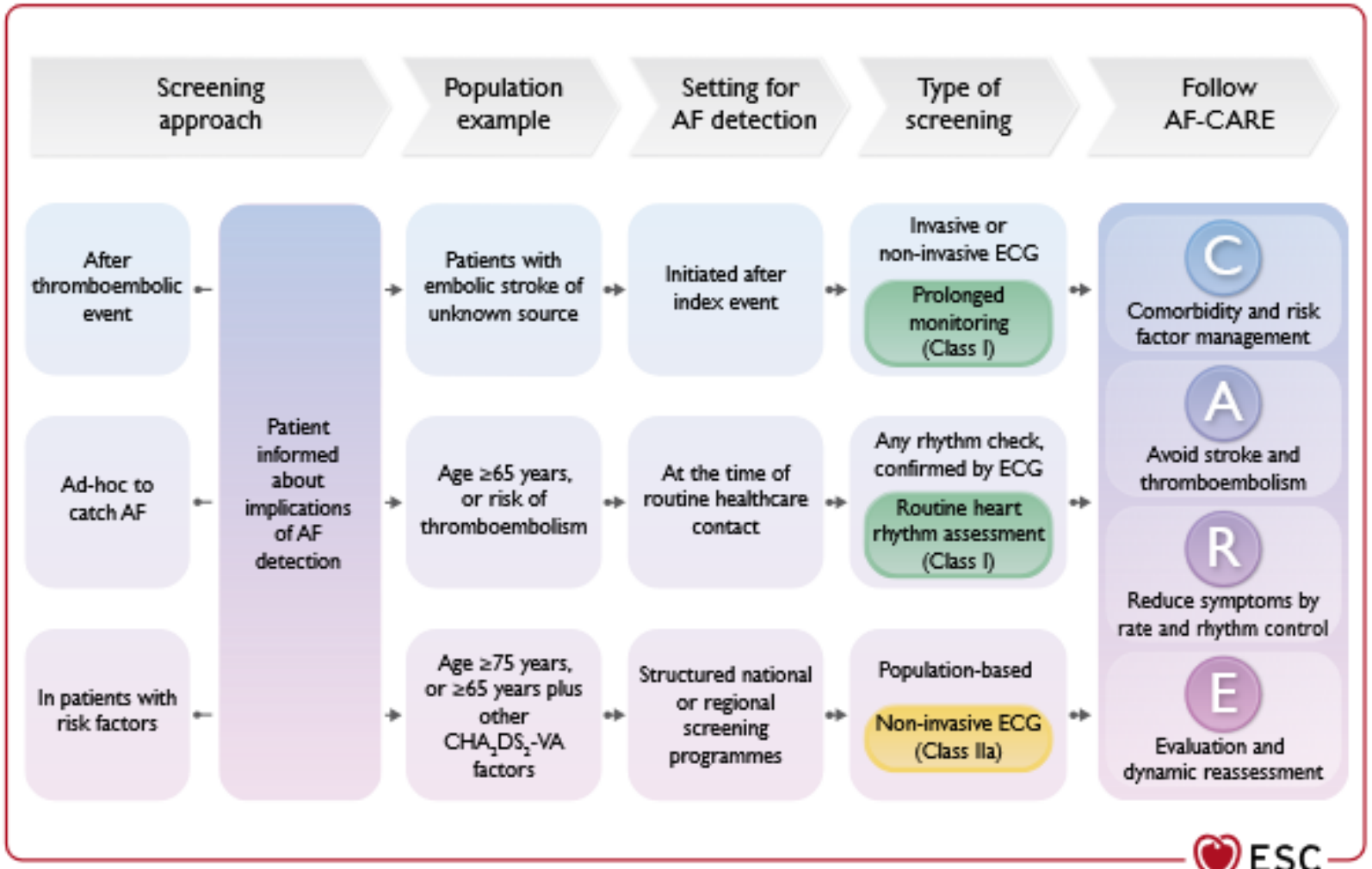
Tools for AF screening

Tools for AF screening

(i) Pulse palpation[1045]
(ii) Use of artificial intelligence algorithms to identify patients at risk[1046]
(iii) ECG-based devices
  (a) Conventional ECG devices
    (1) Classic 12-lead ECG [1047]
    (2) Holter monitoring (from 24 h to a week or more)[1048]
    (3) Mobile cardiac telemetry (during hospitalization)[1049]
    (4) Handheld devices[1050–1052]
    (5) Wearable patches (up to 14 days)[1053–1067]
    (6) Biotextiles (up to 30 days)[1068–1072]
    (7) Smart devices (30 s)[1073–1091]
  (b) Implantable loop recorders (3–5 years)[1092–1099]
(iv) Non-ECG-based devices
  (a) Photoplethysmography and automatic algorithms: contact (fingertip, smart device, band) and contactless (video)[1100–1106]
  (b) Oscillometry (blood pressure monitors that derive heart rhythm regularity algorithmically)[1107–1110]
  (c) Mechanocardiography (accelerometers and gyroscopes to sense the mechanical activity of the heart)[1111]
  (d) Contactless video plethysmography (through video monitoring)[1112–1115]
  (e) Smart speakers (through the identification of abnormal heart rate patterns)[1116]

ECG, electrocardiogram.

Approaches to screening for atrial fibrilation



Handheld devices

Smartwatch

Clinical Use Cases

- Smartwatch - screening tool
- Screening in general population
- Monitoring in high-risk groups
- Symptom-triggered rhythm checks

Smartwatch Advantages

- Accessible & widely adopted
- Consumer wrist devices
- ECG (1-lead) or PPG-based detection
- Event-driven or automated alerts
- Patient-initiated ECG
- Good for symptom correlation

Smartwatches

Evidence

- High sensitivity for AF detection
- Many studies compare with 12-lead ECG
- Effective population screening tool

Smartwatch

Limitations

- Single lead ECG only
- Short ECG recordings
- Possible false alarms required medical confirmation
- Accuracy can be influenced by activities and hand position
- Irregular accuracy across brands

Patch Monitors

Clinical Use Cases

- Unexplained palpitations
- Syncope evaluation
- Suspected paroxysmal AF
- Post-ablation rhythm monitoring

Patch Monitors

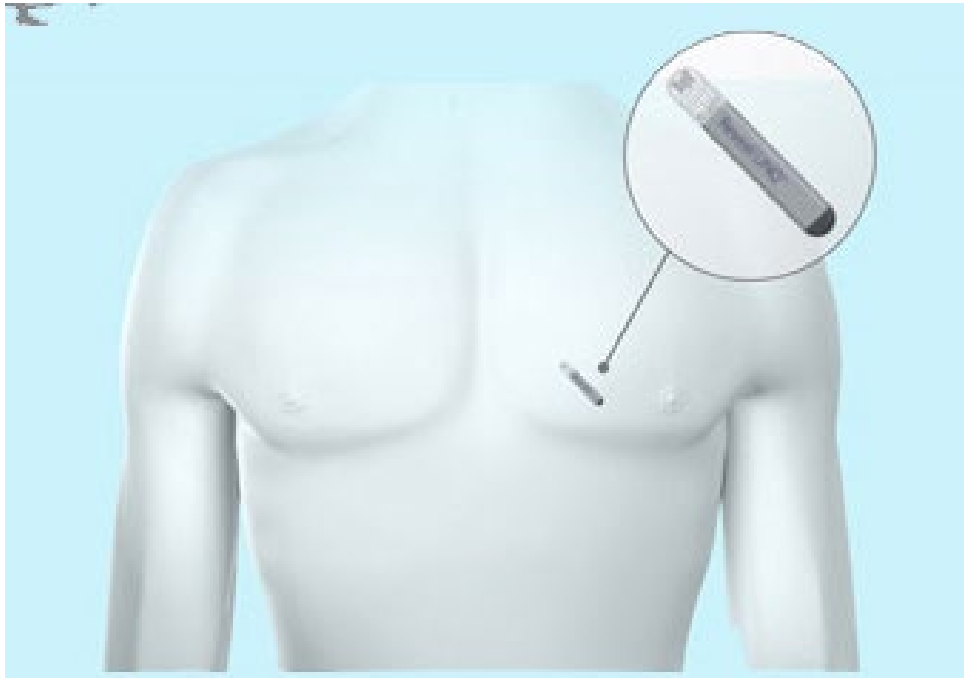
Advantages

- Patch - diagnostic tool
- 14-day patches ↑ AF detection by ~50%
- Useful in syncope & palpitations
- Often superior to 24 h Holter

Smartwatch vs Patch monitoring

Feature	Smartwatch	Patch Monitoring
Duration of Monitoring	Long-term (1-7 days per charge, but may need regular charging)	Long-term (days to weeks depending on patch type)
Comfort for Extended Use	May be bulky or uncomfortable for 24/7 wear	Often more comfortable for continuous wear (small, discreet)
Battery/Power Requirements	Regular charging (often daily or every few days)	Can last from days to weeks on a single patch
Data Accuracy	Good for general health tracking, but less accurate for medical purposes	High accuracy (especially for specific conditions like diabetes or ECG)
Wearer Interaction	Requires user interaction (touchscreen, app)	Minimal interaction, passive monitoring
Use Case	General fitness tracking, sleep tracking, heart rate monitoring	Chronic condition management (e.g., diabetes, heart disease)
Maintenance	Requires regular charging and updates	Patches need replacement (typically after several days)
Cost	Moderate to high (depends on brand/model)	Often high, especially for medical-grade devices
Health Monitoring Focus	Multi-functional (fitness, sleep, heart rate)	Specialized (e.g., glucose monitoring, ECG)

Reveal LINQ



Reveal LINQ

Journal of the American Heart Association

ORIGINAL RESEARCH

Global Results of Implantable Loop Recorder for Detection of Atrial Fibrillation After Stroke: Reveal LINQ Registry

Kazunori Toyoda, MD; Kengo Kusano, MD; Yasuyuki Iguchi, MD; Takanori Ikeda, MD; Itsuro Morishima, MD; Hirofumi Tomita, MD; Taku Asano, MD; Teiichi Yamane, MD; Ichiro Nakahara, MD; Eiichi Watanabe, MD; Junjiroh Koyama, MD; Ritsushi Kato, MD; Hiroshi Morita, MD; Teruyuki Hirano, MD; Kyoko Soejima, MD; Shingen Owada, MD; Haruhiko Abe, MD; Masahiro Yasaka, MD; Toshihiro Nakamura, MD; Scott Kasner, MD; Andrea Natale, MD; Sean Beinart, MD; Alpesh N. Amin, MD; Erika Pouliot, MS; Noreli Franco, PhD; Kazuhiro Hidaka, PhD; Ken Okumura, MD

BACKGROUND: We aimed to quantify the incidence of atrial fibrillation (AF) in patients with cryptogenic stroke globally, as well as separately in patients in and outside of Japan, using an implantable loop recorder from a prospective, observational, Reveal LINQ Registry.

METHODS AND RESULTS: Patients developing cryptogenic stroke and monitored by implantable loop recorder for searching AF were studied. The primary end point was incidence of AF within 36 months after insertion. Secondary end points were recurrent ischemic stroke/transient ischemic attack and AF-related treatment strategies. A total of 271 patients (61.6±14.3 years, 170 men, 60 from Japan) were enrolled from 12 countries. AF was detected in 28.2% at 36 months. The median time from enrollment to AF detection was 7.9 months. During the first 12 months, the AF detection rate slope was relatively steeper in the Japanese subgroup versus non-Japanese patients. However, by 3 years, the cumulative incidence of AF detection did not differ between groups. Age was the only variable associated with AF detection (hazard ratio, 1.05 [95% CI, 1.02–1.07] per year), trending higher in older age groups. Of the 271 patients, 11 (4.1%) developed recurrent ischemic stroke/transient ischemic attack; AF was detected by implantable loop recorder in only 1 of these patients. Patients with detected AF were more commonly taking oral anticoagulation than those without AF at the last follow-up (64.7% versus 25.3%, $P<0.001$).

CONCLUSIONS: The rate of AF detection was similar to other studies in stroke populations monitored by implantable loop recorders, including CRYSTAL-AF (Cryptogenic Stroke and Underlying Atrial Fibrillation), STROKE-AF (Stroke of Unknown Cause and Underlying Atrial Fibrillation) and PER-DIEM (Post-Embolic Rhythm Detection With Implantable Versus External Monitoring). Patients with detected AF more commonly initiated anticoagulation than those without AF.

Key Words: anticoagulation ■ atrial fibrillation ■ cardioembolism ■ cerebral infarction ■ cryptogenic ischemic stroke ■ electrocardiographic monitoring

Digitalni nadzor – prednosti za Crnu Goru

- Rani skrining smanjuje komplikacije i hospitalizacije
- Omogućava praćenje pacijenata u manjim gradovima i ruralnim područjima
- Integracija podataka sa nacionalnom EKG bazom i AI analizom
- Omogućava personalizovanu terapiju i brzu reakciju ljekara

Hvala na pažnji!

NLB