Anticoagulation in AF

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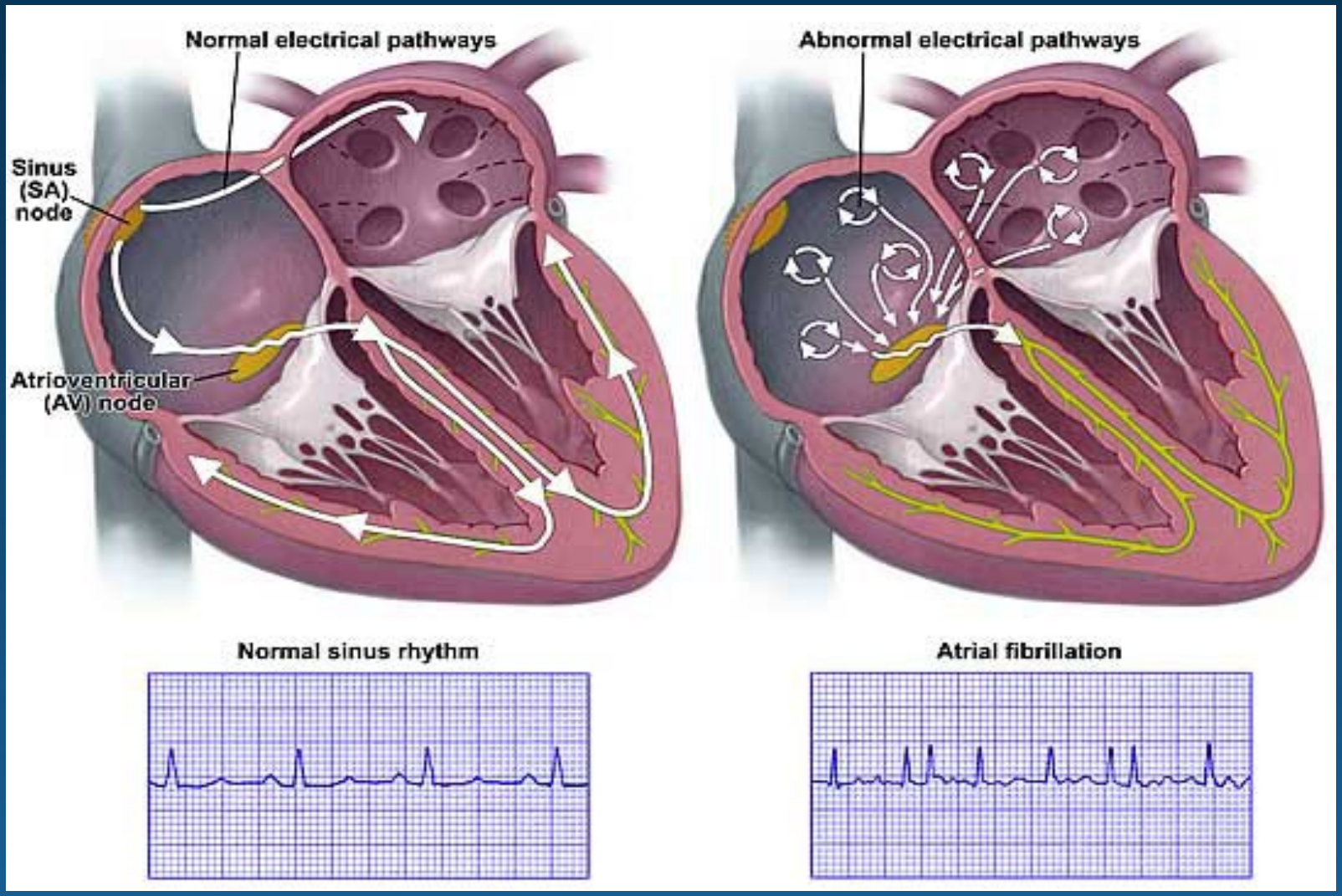
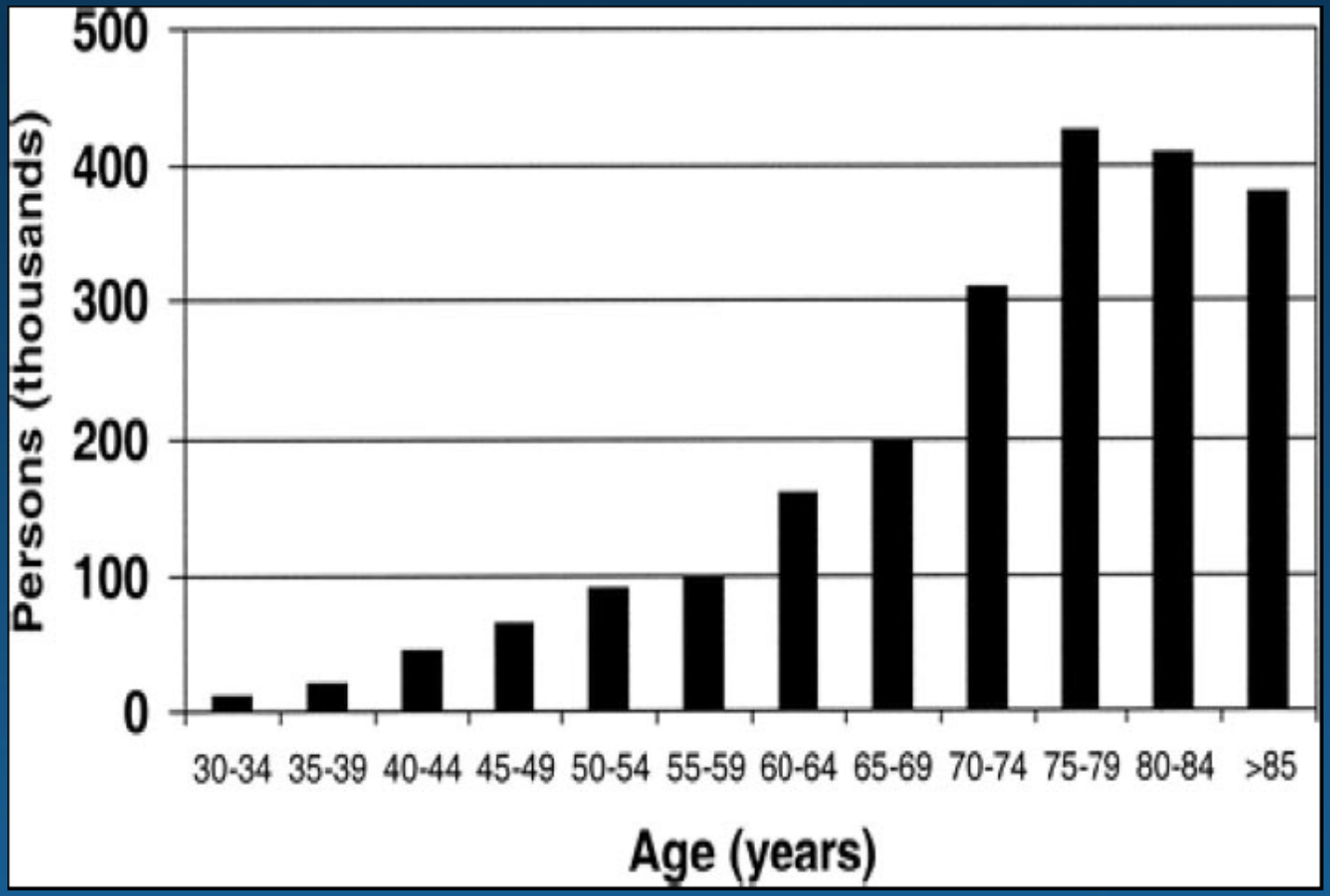
Atrial Fibrillation

- Supraventricular tachyarrhythmia characterized by “chaotic” atrial activity
- No effective atrial contraction
- Irregular and often rapid ventricular response rates
- Stasis predisposes to thrombus in left atrium and left atrial appendage

What is Atrial Fibrillation?



Prevalence


500
400
300
200
100
0
Persons (thousands)
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
>85
Age (years)

Risk Factors

- Age
- Male
- Diabetes
- Hypertension
- Congestive Heart Failure
- Myocardial Infarction
- Valvular Heart Disease

Other Risk Factors

- Hyperthyroidism
- Alcohol Abuse
- Severe Infections
- Pulmonary disease
- Anger and Hostility

Three Different Types of AF

Paroxysmal AF

- AF that converts to sinus rhythm in less than 7 days spontaneously

Persistent AF

- AF requiring chemical or electrical cardioversion to restore sinus rhythm
- Seven days to 12 months = short lasting persistent
- > 12 months = long standing persistent

Permanent

- No further attempts at restoring sinus rhythm

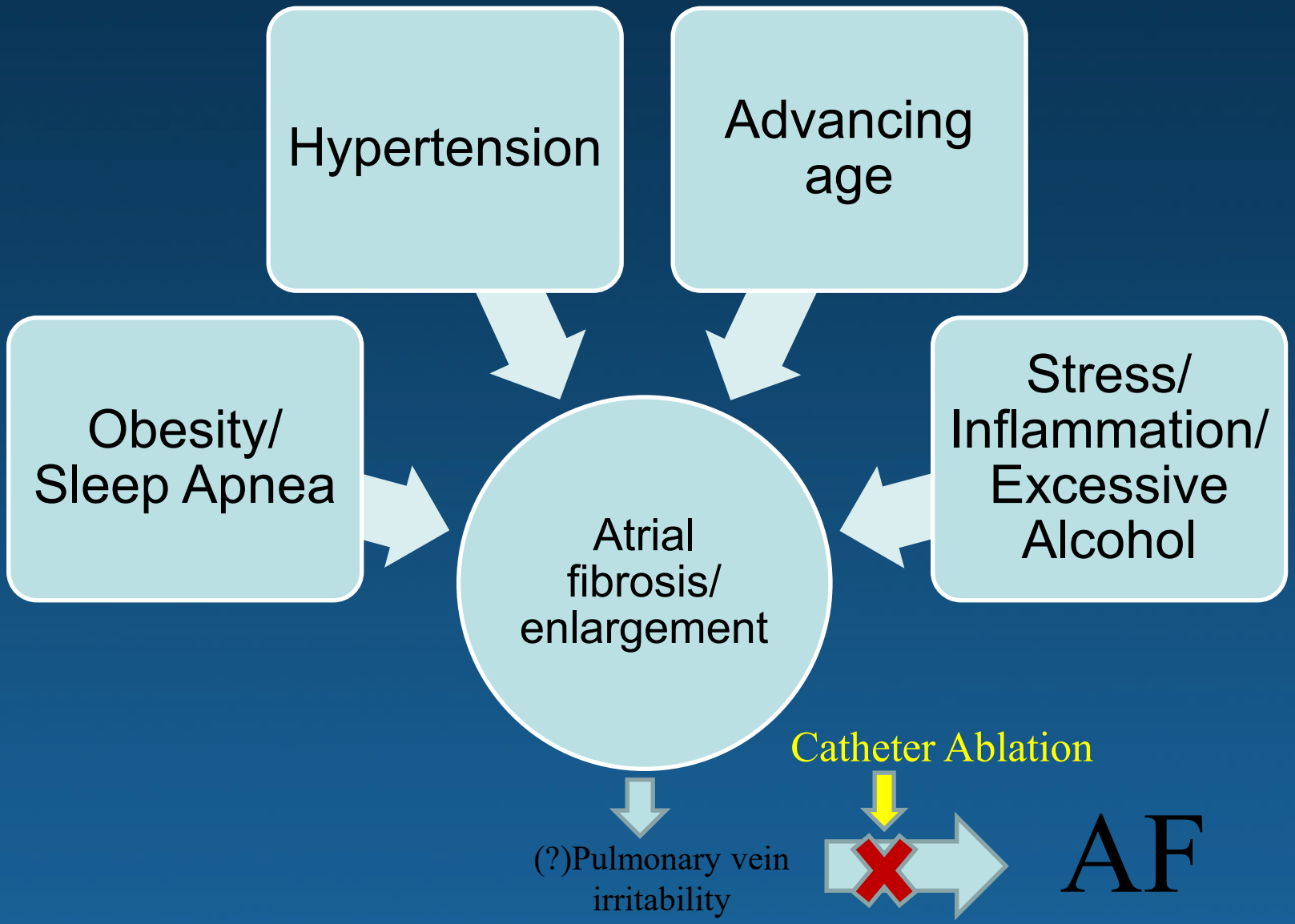
Treatment Options for AF

- **Anticoagulation** to prevent thromboembolism

- **Medication** to control the heart rate

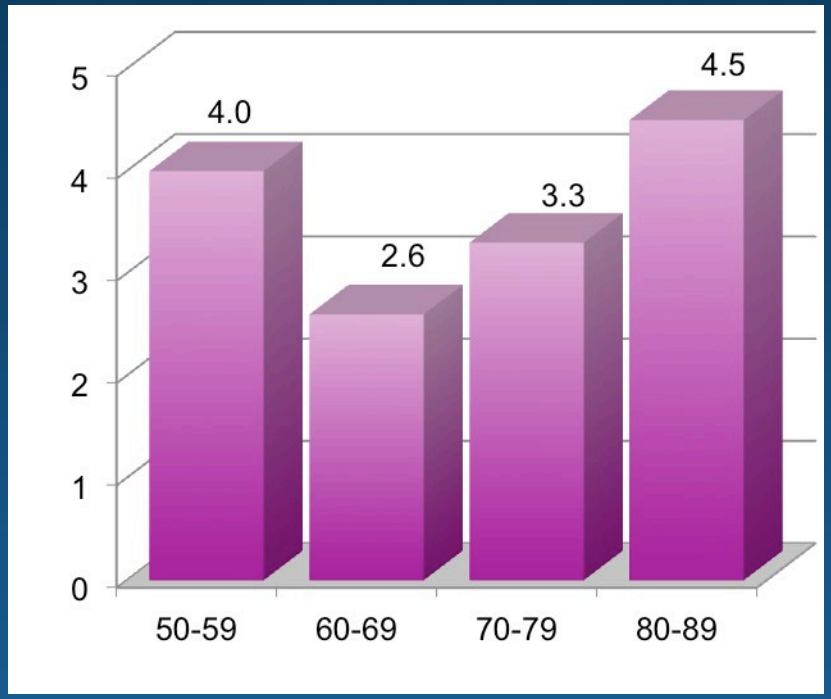
- Restoration of normal heart rhythm either through an **electrical cardioversion, medication, or invasive therapies**

Lifestyle Cascade



Increased Risk of Stroke

AF Increases the Risk of Stroke by Nearly 5-fold

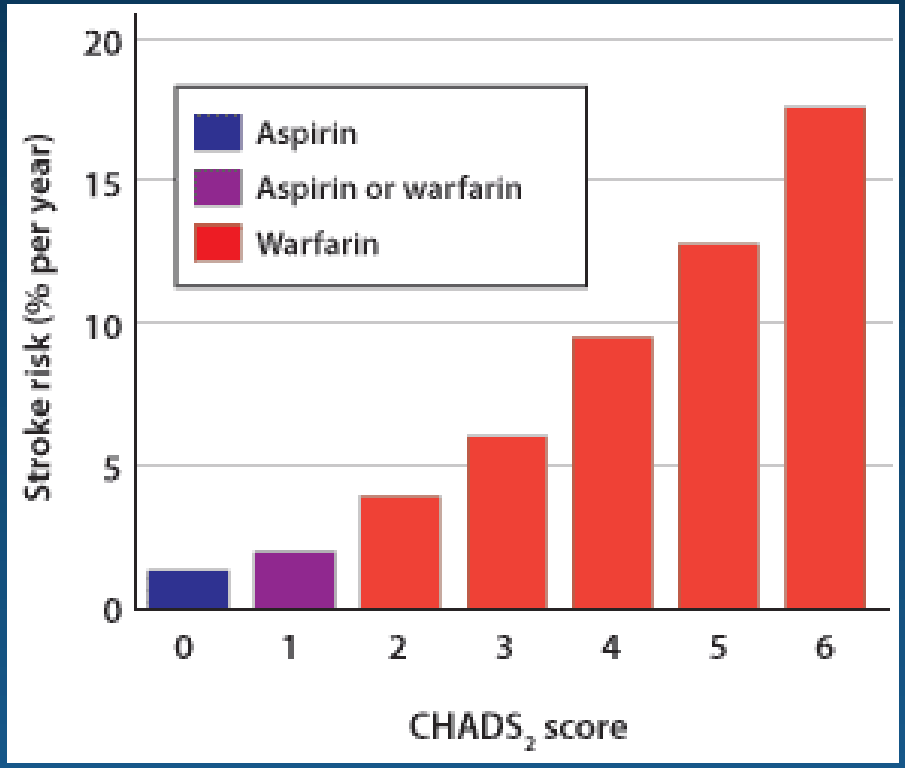


Age (years)

p<0.001 AF vs Non-AF Patients

CHADS2 scoring system

- CHF
- Hypertension
- Age > 75
- Diabetes
- Stroke (2 points)



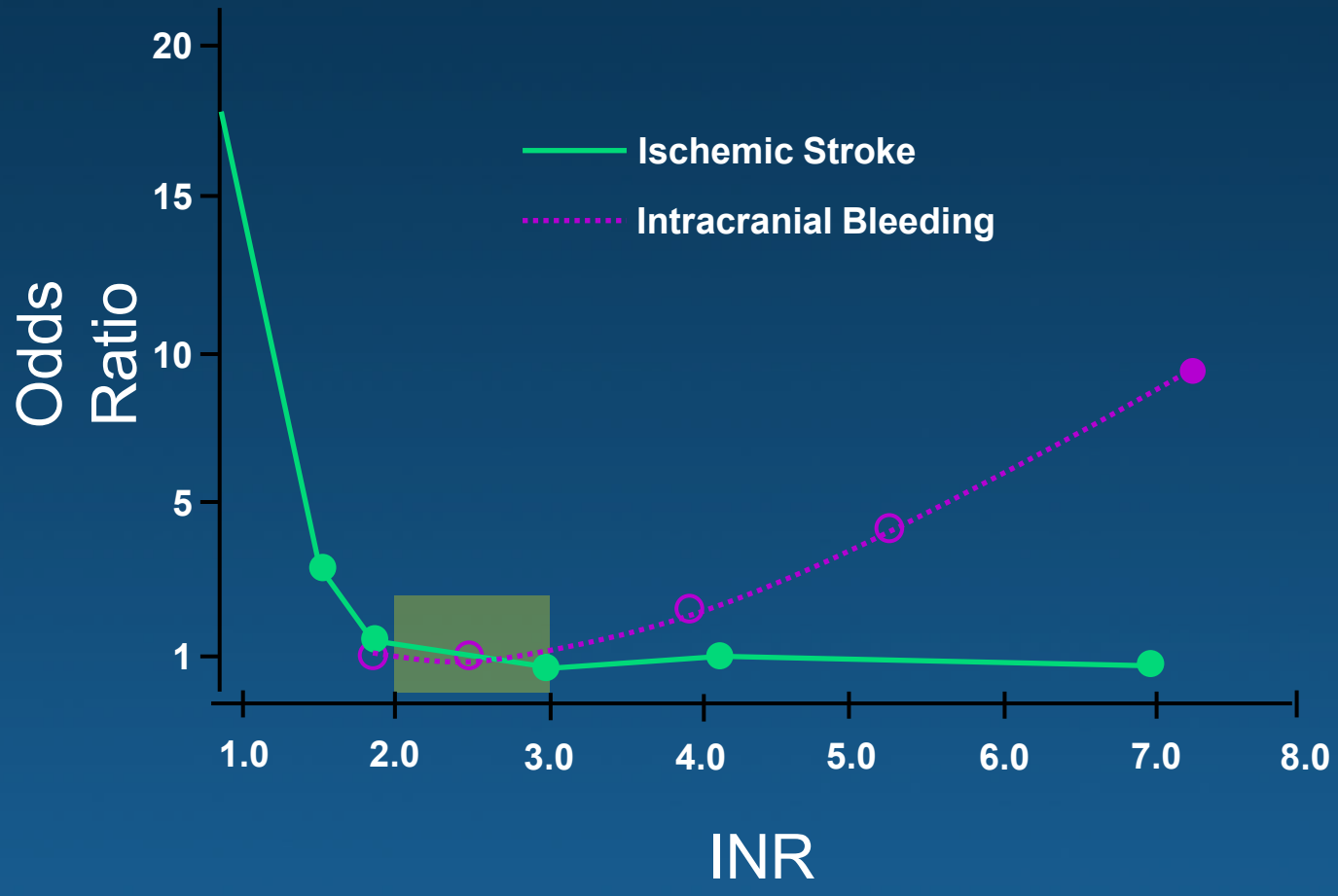
CHA_2DS_2VASc is a newer scoring system

- CHA_2DS_2VASc, developed by Lip et al, is a refinement of the older $CHADS_2$ Score which includes additional stroke risk factors and puts greater emphasis on age as a risk factor

	Condition/Risk Factor	Points
C	Congestive heart failure	1
H	Hypertension	1
A	Age ≥75 years	2
D	Diabetes mellitus	1
S_2	Previous stroke or TIA	2
V	Vascular disease	1
A	Age 65-74 years	1
Sc	Sex (female gender)	1

CHA2DS2-Vasc score	Risk of stroke each year
0	Very close to 0
1	1.3% (1 in 77)
2	2.2% (1 in 45)
3	3.2% (1 in 31)
4	4.0% (1 in 25)
5	6.7% (1 in 15)
6	9.8% (1 in 10)
7	9.6% (1 in 10)
8	6.7% (1 in 15)
9	15.2% (1 in 6)

Warfarin: Risk-Benefit Profile



Fuster V, et al. *Circulation*. 2006;114:e257-354.

Options for Blood Thinners

- Aspirin
- Warfarin (coumadin)
- Dabigatran (Pradaxa)
- Rivaroxaban (Xarelto)
- Apixiban (Eliquis)
- Edoxaban
- Plavix

New Pharmacologic Approaches for Stroke Reduction in AF

- Advantages
  - Fixed-dose, no monitoring
  - Short Half Life
  - No diet, drug interactions

- Disadvantages
  - Fixed-dose, no monitoring
    - No measure of compliance or anticoagulant effect
  - Short Half Life – missing one dose is significant
  - Antidotes coming / here

2014 ACC/AHA/HRS AF Guidelines

CHA_2DS_2-VASC

- Preferred method to calculate risk – replaces CHADS2
- Selection of anticoagulation based on score regardless of pattern of AF

~~**Score**~~

- ~~0 – No antithrombotic is reasonable~~
- ~~1 – No anticoagulant vs ASA vs oral anticoagulation~~
- ~~2 or greater – oral anticoagulation~~

~~**Non-valvular AF**~~

- 'Valvular' defined as mechanical valve or mitral stenosis

2019 ACC/AHA/HRS Focused Update

New Recommendations
Section 4.1.1 - Selection of Antithrombotic Regimen
NOACs are recommended over warfarin where eligible except in those patients with moderate - severe mitral stenosis or a mechanical heart valve.

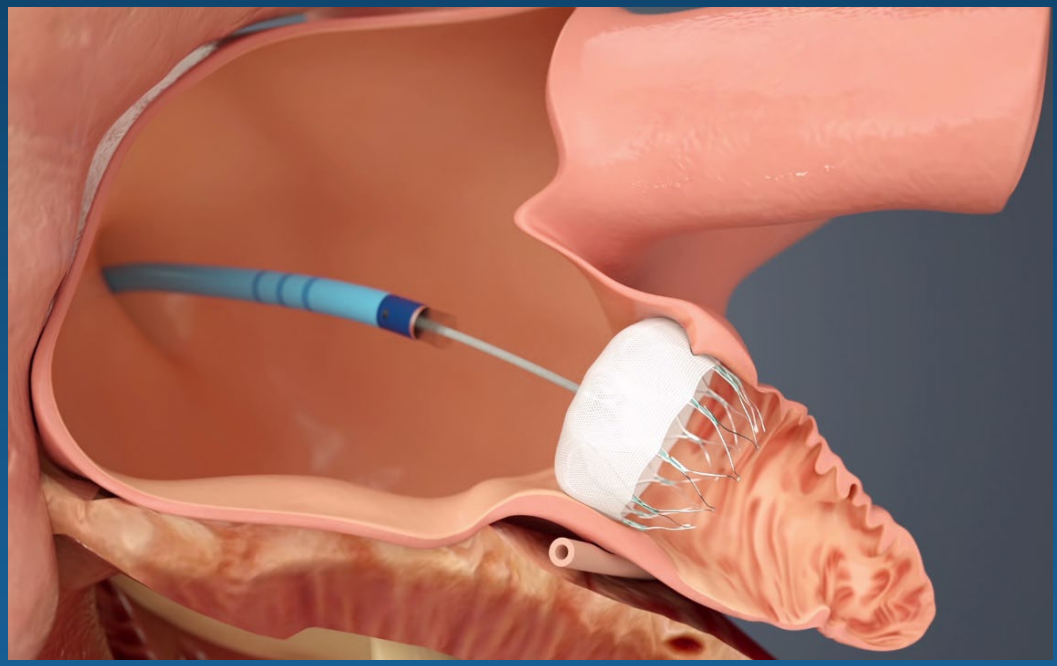
- "Non-valvular" term no longer used
- NOAC preferred!

COR	LOE	Recommendations
	A	1. For patients with AF and an elevated CHA_2DS_2-VASc score of 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended.

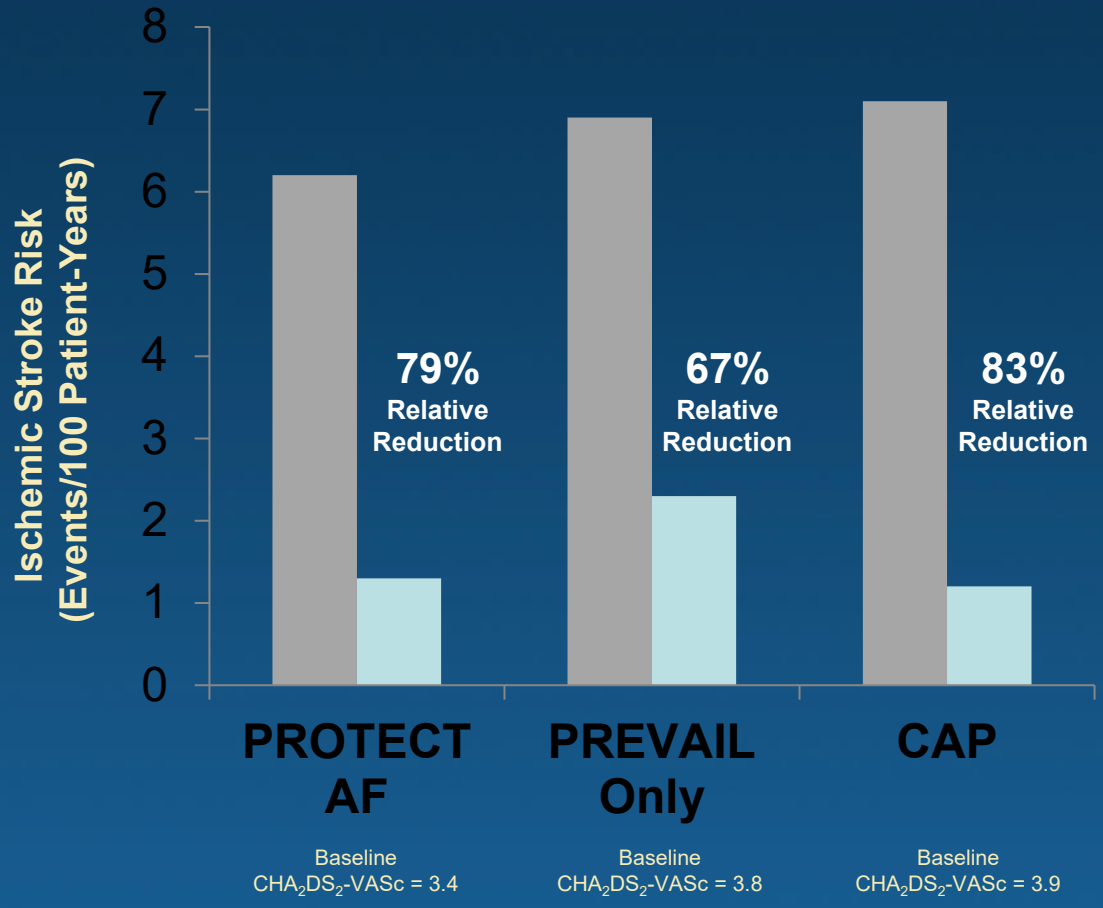
Watchman Implant Procedure

- One-time implant that does not need to be replaced
- Performed in a cardiac cath lab/EP suite, does not need hybrid OR
- Performed by a Heart Team
  - IC/EP or IC&EP, TEE, General Anesthesia, Surgical Back- up, WATCHMAN Clinical Specialist
- Transfemoral Access: Catheter advanced to the LAA via the femoral vein (Does not require open heart surgery)

- General anesthesia*
- 1 hour procedure*
- 1-2 day hospital stay*



Stroke Rates



- Imputed Ischemic Stroke Rate*
- Observed WATCHMAN Ischemic Stroke Rate

FDA Approval of Watchman

The WATCHMAN should only be used in patients who:

Have atrial fibrillation not related to heart valve disease.

Are at increased risk for a stroke

Are recommended for anticoagulation

Are suitable for warfarin short-term

Have an appropriate reason to seek a non-drug alternative to warfarin.

CMS National Coverage Decision

$CHADS_2$ score or ≥ 2 or $CHA_2DS_2Vasc \geq 3$

A formal shared decision making interaction with an independent non-interventional physician using an evidence-based decision tool on oral anticoagulation in patients with NVAF prior to LAAC. Additionally, the shared decision making interaction must be documented in the medical record.

A suitability for short-term warfarin but deemed unable to take long term oral anticoagulation following the conclusion of shared decision making, as LAAC is only covered as a second line therapy to oral anticoagulants. The patient (preoperatively and postoperatively) is under the care of a cohesive, multidisciplinary team (MDT) of medical professionals. The procedure must be furnished in a hospital with an established structural heart disease (SHD) and/or electrophysiology (EP) program.

**** Patients with ejection fraction <30% were not included in the studies*

2019 ACC/AHA/HRS Focused Update

Section 4.4.1 - Percutaneous Approaches to Occlude the Left Atrial Appendage
Percutaneous LAAO should be considered for those AF patients at an increased risk of stroke who have contraindications to long-term anticoagulation and who are at high risk of thromboembolic events.

Who are these patients?

$CHADS_2$ score or ≥ 2 or $CHA_2DS_2Vasc \geq 3$

Significant or recurrent hemorrhage

- GI
- GU
- Intracranial hemorrhage
- Recurrent Epistaxis

Recurrent falls / fall risk (neurologic condition)

Occupational Hazard

Lifestyle

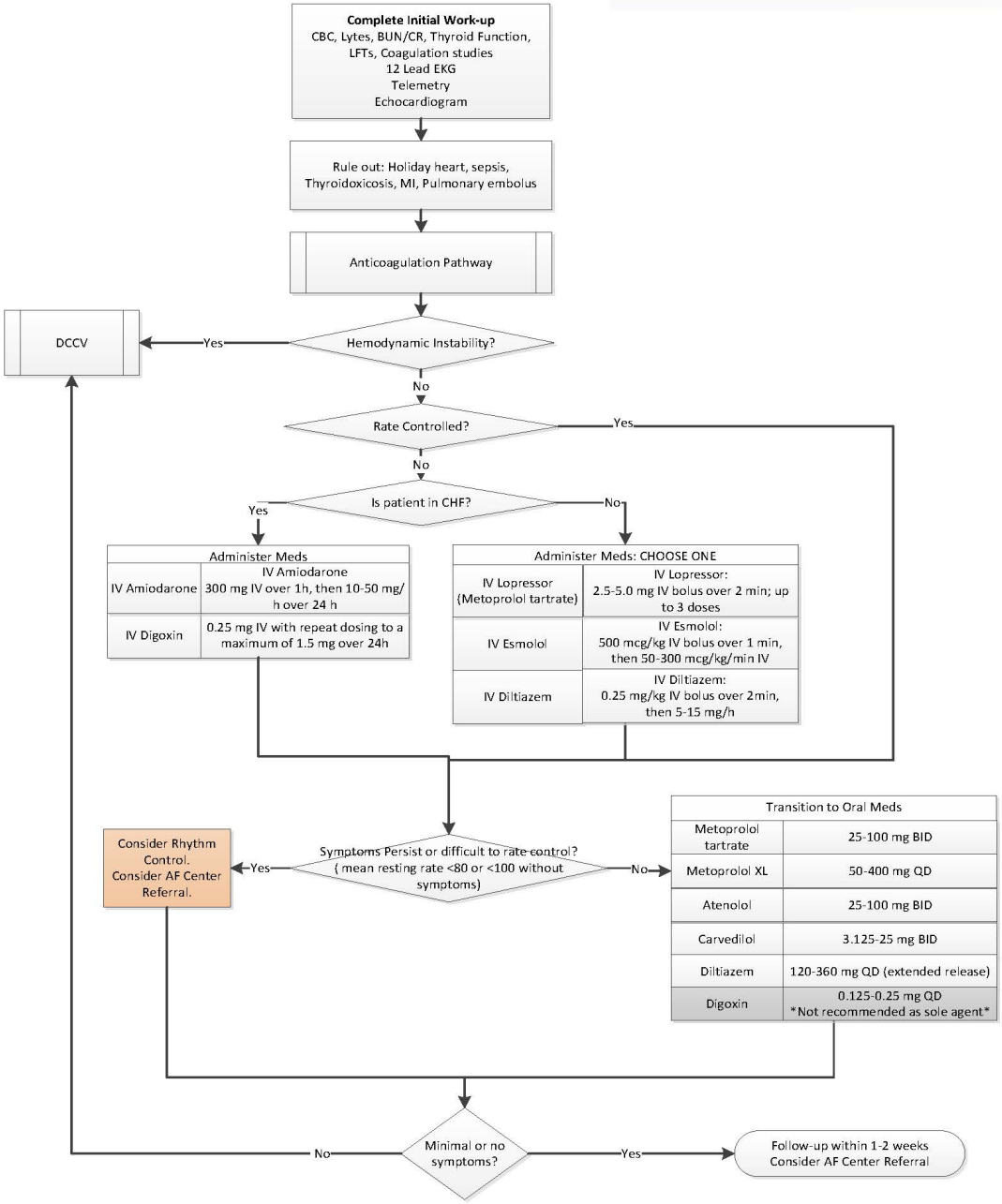
UPMC Heart and Vascular Institute

Center for Atrial Fibrillation

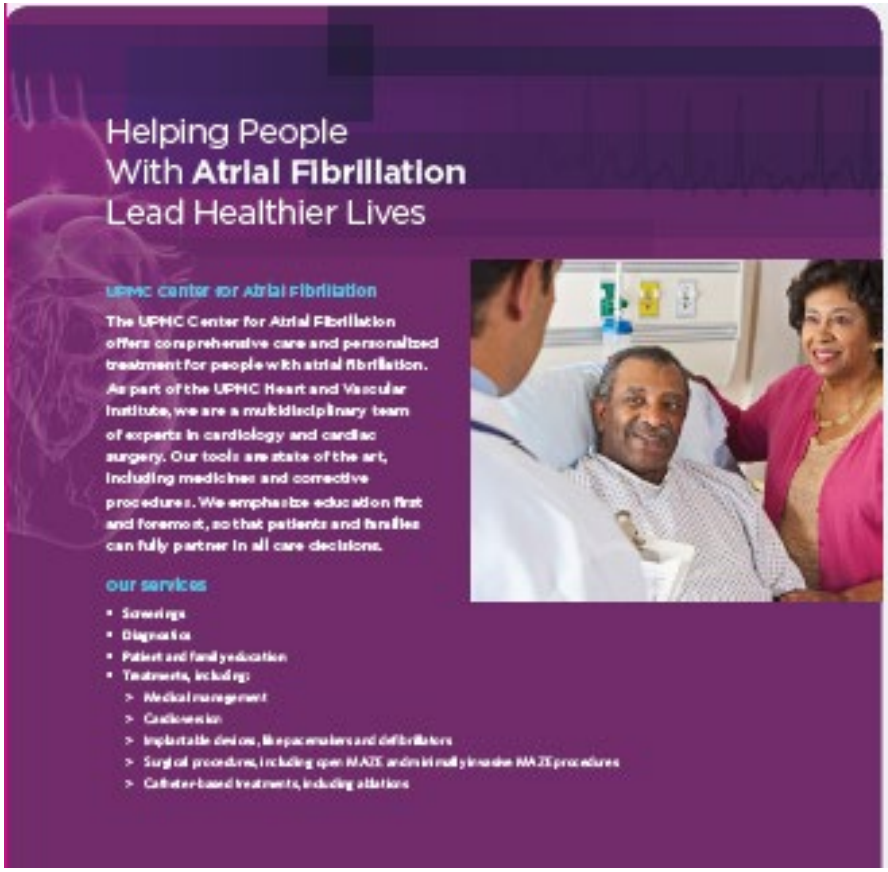
MISSION

- Improve community diagnosis of AF
- Minimize the incidence of AF-attributable stroke
- Diminish unnecessary AF-attributable hospital encounters
- Provide meaningful education to as to causes, consequences, and treatment options for AF
- Provide expertise in all possible AF treatment options
- Examine value of individual treatment options

AF Rate Control Algorithm



Patient Education Packet



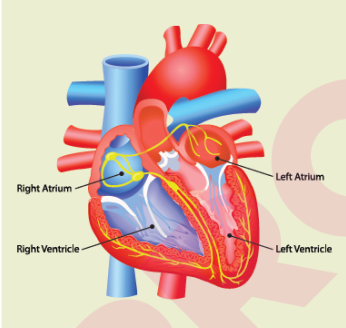
UPMC LIFE CHANGING MEDICINE

AF Education

UPMC Center for Atrial Fibrillation

What is Atrial Fibrillation?

The heart pumps blood and oxygen throughout the body, relying on electrical signals to keep its four chambers in rhythm. During a regular heartbeat, these electrical signals keep the top chambers, called atria, moving in time with the bottom chambers, called ventricles.



Atrial fibrillation, also called AF or AFib, happens when the heart's electrical system sends out irregular electrical signals that cause the atria to quiver, or fibrillate. Extra electrical signals are then sent to the ventricles, creating a fast and irregular heartbeat.

Symptoms of atrial fibrillation can include:

- Palpitations (fluttering in the chest)
- Chest discomfort
- Dizziness or light-headedness
- Shortness of breath
- Weakness
- Fatigue

Many people have minimal or no symptoms, and symptoms can vary from day to day or episode to episode.

Atrial fibrillation that comes and goes by itself is called paroxysmal atrial fibrillation, while atrial fibrillation that is present until and unless there is some intervention to stop it is called persistent atrial fibrillation.

What causes atrial fibrillation?

Age is a leading risk factor for atrial fibrillation. It is common in people over 60, and the older you get, the greater your risk.

Your lifestyle—including what you eat, how often you exercise, how you sleep, if you're under a lot of stress, whether you smoke or chew tobacco, and if you drink alcohol frequently or heavily—also plays a big part in your risk for atrial fibrillation.

Other risk factors include:

- Obesity
- High blood pressure
- Diabetes
- Sleep apnea
- Having other heart problems, like having heart failure, a prior heart attack, or previous heart surgery

Is atrial fibrillation dangerous?

Atrial fibrillation usually isn't life-threatening on its own, but it can lead to decreased quality of life and other serious or potentially life-threatening conditions, such as cardiomyopathy (weakened heart muscle) and stroke.

During atrial fibrillation the top chambers of the heart pump ineffectively, making it easier for blood clots to form. If a clot breaks loose and moves to the brain, a stroke can occur. The risk of stroke varies among people with atrial fibrillation based on age, gender, and medical history.

How is atrial fibrillation treated?

The experts at the UPMC Center for Atrial Fibrillation apply the latest in atrial fibrillation research and knowledge to create customized treatment plans for each patient. We also provide extensive education for each patient, because we know that patients who understand their diagnosis become more active in their treatment—and that can make a difference in their recovery.

Treatments may include:

- Lifestyle changes
- Medical management
- Cardioversion
- Implanted devices, like pacemakers or defibrillators
- Surgical procedures
- Catheter-based ablation procedures

Lifestyle Changes

A healthy lifestyle is the foundation for your care strategy. Lifestyle changes that can prevent or decrease atrial fibrillation include:

- Losing weight
- Maintaining a healthy diet
- Exercising regularly
- Limiting alcohol intake
- Limiting caffeine intake
- Quitting smoking
- Implementing stress/anxiety reduction techniques

It's important to identify and treat other diseases that are often associated with atrial fibrillation, like high blood pressure, diabetes, and sleep problems.

And, it's critical to find out how likely you are to have a stroke. The experts at the UPMC Center for Atrial Fibrillation use a tool called the CHA_2DS_2 – VASc, which assesses your age, gender, and medical history to determine your risk.

Medical Management

Some cases of atrial fibrillation may be managed through medications that prevent blood from clotting, or that slow or regulate the heart rate.

Medications that prevent blood clots are called anticoagulants and are commonly known as "blood thinners." These include:

- Warfarin (Coumadin®)
- Apixaban (Eliquis®)
- Rivaroxaban (Xarelto®)
- Dabigatran (Pradaxa®)
- Edoxaban (Savaysa®)
- Aspirin

Medications that slow the heart rate include:

- Digitalis or Digoxin
- Verapamil
- Diltiazem (Cardizem®)
- Metoprolol (Lopressor®)
- Atenolol (Tenormin®)

And, medications that regulate the heart rate include:

- Sotalol (Betapace®)
- Dofetilide (Tikosyn®)
- Flecainide (Tambocor®)
- Propafenone (Rhythmol ®)
- Amiodarone (Pacerone®, Cordarone®)
- Dronedarone (Multaq®)

Cardioversion

Cardioversion is a noninvasive procedure that restores your heart's normal rhythm with electrical shock or chemical intervention. Electrical cardioversion delivers an electrical shock to your heart via adhesive pads which are placed on your chest while you are under anesthesia. Chemical cardioversion uses medicine to achieve the same effect.

Implantable Devices

In some patients with atrial fibrillation, a pacemaker or defibrillator may be recommended. These are devices implanted in your body that can help regulate your heartbeat. Pacemakers ensure that your heart rate does not become too slow, and defibrillators can deliver a shock for dangerous, abnormal rhythms.

Surgical Procedures

Some people with atrial fibrillation are treated through surgery. This usually happens when less invasive treatments have been unsuccessful, or when structural changes of the heart exist—such as enlarged heart chambers or a leaking valve.

The MAZE procedure is the gold standard of open heart surgery for atrial fibrillation. In the MAZE procedure, surgeons use tiny incisions in your heart to create a maze-like pattern of scars in the atria, and these scars block the transmission of erratic electrical signals. Some patients may be able to have a minimally invasive MAZE procedure that does not involve opening the breast bone.

Catheter-based Ablation Procedures

Ablation is a minimally invasive surgical procedure that destroys the small areas of tissue in your heart that cause atrial fibrillation. The specialists at the UPMC Center for Atrial Fibrillation are experts at ablation techniques and have authored book chapters and research publications on the subject.

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Risk Assessment

CHA_2DS_2-VASc and Your Risk of Stroke

Risk Factors	Points	Score
C: Congestive Heart Failure	1	
H: Hypertension	1	
A: Age >/= 75 years	2	
D: Diabetes Mellitus	1	
S: Prior stroke/TIA/Thromboembolism	2	
V: Vascular Disease	1	
A: Age 65-74 years	1	
Sc: Sex Category (Female)	1	
	Your Total	

0 = Low Risk

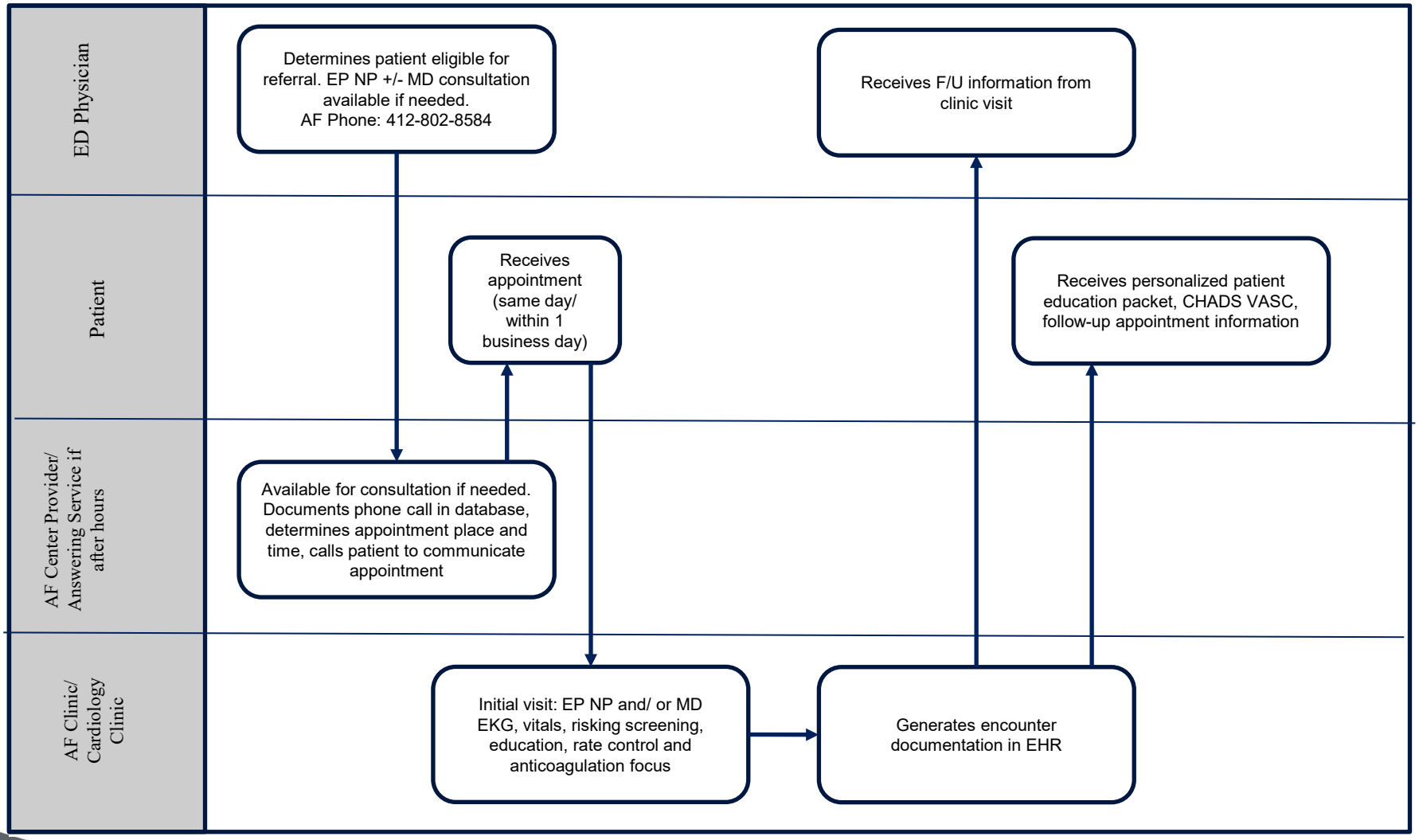
1 = Moderate Risk

2 or greater = High Risk

Our Strategy – New AF diagnosis referrals

- 24/7 consult service with the Center for AF
- Initial educational and “triage” visit through a physician extender
- Quick turn-around (<24 hours) appointments with a Center for AF provider
- Patient education to promote disease literacy

ED to Center for AF Workflow



ED Algorithm

Patient Presents to ED with AF

Consultation and Scheduling:
412-802-8584

All of:

- Primary ED Dx is AF
- Spontaneous conversion to sinus rhythm OR mild symptoms if persistent AF
- Vitals
  - HR $\leq$ 110
  - Hemodynamically stable
  - O_2 sat (RA) > 95%
- No overt signs of volume overload (crackles, edema, JVD)
- No acute concomitant illness

Low Risk AF Patient:

- Discharge
- Follow up with Center for AF

All of:

- Primary ED Dx is AF
- Spontaneous conversion to sinus rhythm OR moderate symptoms if persistent AF
- Vitals
  - HR >110
  - Hemodynamically stable
  - O_2 sat (RA) > 92%
- No or mild signs of volume overload (crackles, edema, JVD)
- No acute concomitant illness

Moderate Risk AF Patient:

- Rate control to resting heart rate <130

Disposition options:

- **Consult AF provider and follow up in Center for AF**
- **Admit to hospital**

Any of:

- Severe symptoms if persistent AF
- Syncope
- Vitals
  - HR > 130 despite rate control
  - O_2 sat (RA) < 92%
- Overt signs of volume overload (crackles, edema, JVD)
- Acute concomitant illness

High Risk AF Patient:

- Admit to hospital
- Follow up in Center for AF as outpatient

UPMC LIFE CHANGING MEDICINE

UPMC AF Center and Heart Rhythm Society Initiative

- Goal: To create awareness of current evidenced based anticoagulation guidelines and improve anticoagulation prescribing rates among CMI practices for patients with atrial fibrillation

  – Review patients who have been identified to have a CHA2DS2-VASc score of 2 or greater in males or 3 or greater in females that are not on anticoagulation

  – Identify why anticoagulation is not currently prescribed and determine if the patient should be on an anticoagulant based on the guidelines that were reviewed

  – Identify the need for further evaluation by the AF Center or intervention such as LAAO

Provider Worksheet

UPMC Center for Atrial Fibrillation

Provider Name Here, MD

MRN	Patient Name	No clear AF history	Patient is on OAC	Bleed History or risk/ specify type	Age	Cost	Chronic Anemia	Fall Risk	Patient Refusal	Medication Contraindication	Will plan to start OAC	AF Center Referral	Comments

Intracranial Bleed
GI Bleed
Hematuria
Liver Disease
Varices
Hemarthrosis
Recurrent Epistaxis
Other Internal Bleed

Provider Name Here | Drop Downs | ⊕

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