

Update on Management of Atrial Fibrillation and new technology in arrhythmia treatment

Continuing Education
 Santa Ana College
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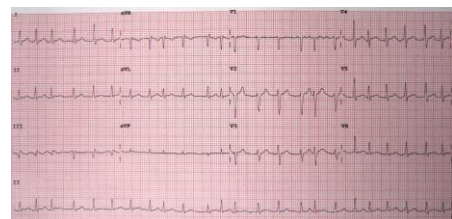
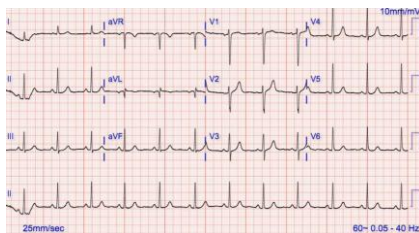
Disclosures
 None

Objectives

- To review the epidemiology, pathophysiology and risk factors of atrial fibrillation.
- To review diagnosis, treatment and management of atrial fibrillation.
- Discuss pharmacologic options for treatment, including anticoagulation and antiarrhythmics.
- Discuss procedural treatment options for atrial fibrillation.
- Discuss the latest technology in arrhythmia management.

Case Review - JB

- 83 yo female in for routine office visit
- PMH: paf, cad, chf, mild copd
- CC: "I feel tired," some doe
 - Denies CP, palpitations
 - Eliquis 5 mg daily, metoprolol succinate 25 mg daily, lisinopril 5 mg daily
- EKG shows...



Case Review - JB

- ECG – Afib 130 – 150
- 107/58, 16, 98% RA, Cr Cl = 65
- A&O x 3, Denies SOB at rest, CP. + Fatigue. Feels "OK."
- What is the plan?
 - Labs WNL, ef 40%, LMIBI no ischemia.
 - Is immediate action needed?
 - Does she need: Rhythm vs rate? Anticoagulation? TEE? CVSN? Ablation? AAT?

Atrial Fibrillation Defined

- Supraventricular tachyarrhythmia with uncoordinated atrial activity and subsequent ineffective atrial contraction.
- ECG:
 - Irregular R-R
 - Absence of P waves
 - Tachy-brady ventricular response
- 15% reduction in cardiac output

Atrial Fibrillation

- AF affects 3 million – 6 million American adults
- Sx range from nonexistent to severe
- Frequent hospitalizations
- Hemodynamic instability
- 3-fold risk of HF
- 5-fold increased risk of stroke
 - AF-related stroke likely more severe than non-AF-related stroke*

January 15, 2014 AHA/ACC/HRS Guideline for Management of Atrial Fibrillation

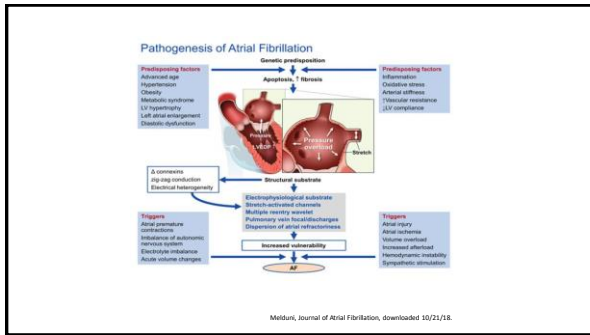
A Global Epidemic

Epidemiological Studies

- Chugh et al. (2014) review of 184 studies
- Comparison from 1990 - 2010
 - Prevalence of AF increased worldwide
 - Higher prevalence and incidence in developed countries

Pathophysiology of Atrial fibrillation

Lau, DJ, et al. (2017) Heart, Lung and Circulation. Downloaded from https://www.ahajournals.org/ on 8/29/19



Definitions of Atrial fibrillation

Term	Definition
Paroxysmal AF	<ul style="list-style-type: none"> AF that terminates spontaneously or with intervention within 7 d of onset. Episodes may occur with variable frequency.
Persistent AF	<ul style="list-style-type: none"> Continuous AF that is sustained >7 d.
Long-standing persistent AF	<ul style="list-style-type: none"> Continuous AF >12 mo in duration.
Permanent AF	<ul style="list-style-type: none"> The term "permanent AF" is used when the patient and clinician make a joint decision to stop further attempts to restore and/or maintain sinus rhythm. Acceptance of AF represents a therapeutic attitude on the part of the patient and clinician rather than an inherent pathophysiological attribute of AF. Acceptance of AF may change as symptoms, efficacy of therapeutic interventions, and patient and clinician preferences evolve.
Nonvalvular AF	<ul style="list-style-type: none"> AF in the absence of rheumatic mitral stenosis, a mechanical or bioprosthetic heart valve, or mitral valve repair.

JANUARY CT, ET AL., 2014 AHA/ACC/HRS GUIDELINE FOR MANAGEMENT OF AFIB., JACC, 2014.03.022.

Treatment Options

Rate Control Strategy

Rhythm Control

Benefits of OAC in Atrial Fibrillation

Stroke Statistics

- 5th lead cause of death in US, > 130,000/yr, 1/20 deaths
- Stroke occurs every 40 seconds in US, every 4 minutes someone dies from stroke
- 795,000 US strokes per year
- Costs \$33 billion per year

Mozaffarian et al. 2016. AHA.

CHA₂DS₂-VASC* score

Risk factor Score	Score
Competitive heart failure/LV dysfunction	1
Hypertension	1
Age ≥ 75	2
Diabetes mellitus	1
Stroke/TIA/thrombo-embolism	2
Vascular disease*	1
Age 65-74	1
Sex category (i.e. female sex)	1
Maximum score	9

January CT, et al., 2014 AHA/ACC/HRS Guideline for Management of AFib., JACC, 2014.03.022.

Who gets anticoagulated?

- CHA₂DS₂-VASC = 0 – may omit antithrombotic therapy (Class IIa, LoE B)
- CHA₂DS₂-VASC = 1 – “no antithrombotic therapy or treatment with an oral anticoagulant or aspirin may be considered” (Class IIb, LoE C)
- **CHA₂DS₂-VASC ≥ 2 for men or ≥ 3 for women – anticoagulation recommended

January CT, et al., 2014 AHA/ACC/HRS Guideline for Management of AFib., JACC.

Choices of anticoagulants

- Heparin – IV
- LMWH – SQ
- Coumadin
- DOACs – 2010
 - apixaban (Eliquis)
 - rivaroxaban (Xarelto)
 - dabigatran (Pradaxa)
 - edoxaban (Savaysa)
- **Exclusion criteria for CHA₂DS₂-VASC assessment and use of NOACs now defined as moderate to severe mitral stenosis or a mechanical heart valve.
- ** DOACs now recommended over Coumadin

DOACs for Atrial fibrillation

- Advantages
 - More predictable pharmacological profiles
 - Similar or lower ischemic stroke rates c/t warfarin
 - Less ICH than warfarin
 - Rapid onset (1-2 hrs) and offset
 - Absence of dietary
- Disadvantages
 - Cost (5x coumadin)
 - “Missing even 1 dose could result in a period without protection from thromboembolism.”
 - Not to be used in mechanical heart valves*, HD significant mitral stenosis, severe renal impairment.

January CT, et al., 2014 AHA/ACC/HRS Guideline for Management of AFib., JACC, 2014.03.022. Manning et al., 2013.

How to choose

- Cancer
- Liver disease
- Kidney disease
- CAD
- Dyspepsia
- Other medications
- Poor compliance
- Patient preference
- Need or desire for reversal
- Pregnancy
- Cost/coverage
- Fall risk

CHA₂DS₂-VASc ≥ 2 – indefinite

CHA₂DS₂-VASc = 1 – depends on clinical setting

- CVSN
- PVA

Duration of therapy Atrial fibrillation

Risk factors for bleeding

- Age
- History of bleeding
- Cancer
- Kidney disease
- Liver disease
- Thrombocytopenia
- Anemia
- Previous CVA
- Diabetes
- Antiplatelet therapy
- Medical non-compliance
- Falls
- Recent surgery
- Alcohol abuse

Karon et al., 2016.

Risk	Score
Hypertension	1
Abnormal kidney/liver function	1 or 2
Stroke	1
Bleeding history	1
Labile INR	1
Age > 65	1
Drugs/ETOH	1 or 2

HAS-BLED



Tools

- ACC Anticoag Evaluator
- iTunes
- Google Play
- <http://www.acc.org/tools-and-practice-support/mobile-resources/features/anticoag-evaluator>

Triple Threat

Yang, Vessel Med, 2012. From <https://open.oxjib.org> Downloaded with permission 8/26/17.

Holding therapy

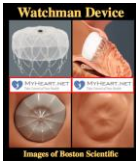
Drug	Time to hold
Coumadin	Depending on INR
Apixaban (Eliquis)	> 24 hours in low bleed risk, > 48 hours is moderate bleed risk
Rivaroxaban (Xarelto)	> 24 hours
Dabigatran (Pradaxa)	1-2 days
Savaysa (edoxaban)	> 24 hours

Cost per Month

Payor	Eliquis	Xarelto	Pradaxa	Savaysa	Warfarin
GoodRX.com	\$448.12	\$451.91	\$417.97	\$368.36	\$4.00



WATCHMAN



- Indicated to decrease risk of thromboembolism from LAA in patients with AF
- Hx bleeding
- Labile INR
- Medical condition, occupation or lifestyle that increases bleeding risk

WATCHMAN Video



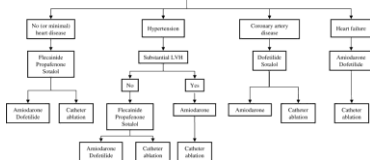
- <https://www.watchman.com/en-UK-HCP/about-watchman-implant/implant-procedure.html>

ANTIARRHYTHMICS



ACC/AHA GUIDELINES FOR ATRIAL FIBRILLATION, 2014

Maintenance of Sinus Rhythm



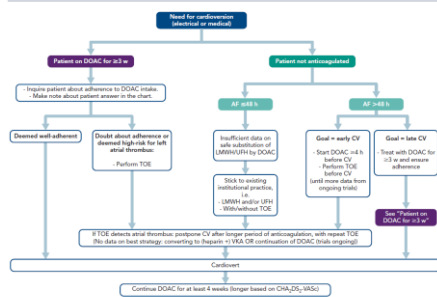
EP Procedures

- Cardioversions
 - Chemical
 - Electrical
- Ablations
 - PVA
 - Atrial Flutter
 - AVNRT
 - AVB
 - PVC, VT
- Devices
 - **CHA2DS2-VASc**
 - Pacemakers, MICRA
 - ICDs - single, dual, BIV, S-ICD
 - Device upgrade or generator change
 - **WATCHMAN**
- Other
 - EPS
 - Lead Revisions
 - **Laser Lead extractions**
 - Drug loads
 - TEE

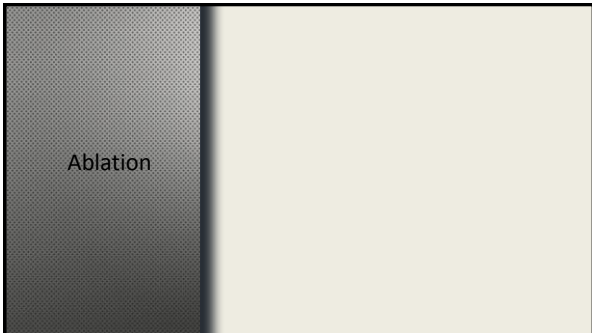
Cardioversion

- Electrical or pharmacologic
 - Chemical - Flecainide 300 mg PO x 1
 - Electrical
- Need for TEE?
 - CHA₂DS₂-Vasc
 - Determine AF < 48 hours or AF > 48 hours
- Anticoagulation strategy
- Antiarrhythmic strategy

Figure 2. Cardioversion Protocol in Patients with AF Treated with Direct Oral Anticoagulants

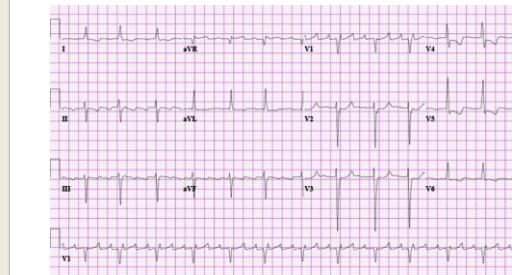


DOAC = direct oral anticoagulant; LMWH = low molecular weight heparin; LPH = low-molecular-weight heparin; LPWH = low-molecular-weight heparin; TOE = transesophageal echocardiography; VKA = vitamin K antagonist; CV = cardioversion.



PVA

- Goal: Interrupts conduction of Afib from arrhythmic tissue in the pulmonary veins
- Access via R and L femoral veins
- 4-6 hour procedure due to amount of ablation
- 1-2 L fluids
- Closure with manual pressure or figure 8 sutures (remove in AM)
- PACU



Atrial Flutter



- Typical atrial flutter
 - R atrial
 - Easy to ablate
 - 92% - 97% success
 - OAC 1 month
- Atypical atrial flutter
 - R or L atria
 - More involved ablation
 - Success rate?
 - OAC by CHA₂DS₂-Vasc score

AVJ Ablation

- Must have PM/ICD in place
- Difficult to control AF



Devices

- LINQ/Confirm
- Pacemakers, MICRA
- ICDs - single, dual, BiV, S-ICD
- Device upgrade or generator change
- WATCHMAN

ILR

- Reveal LINQ**
- Medtronic

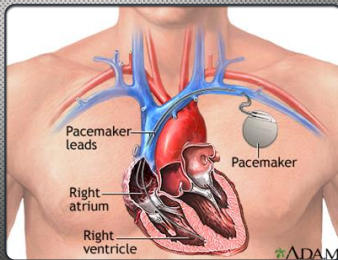


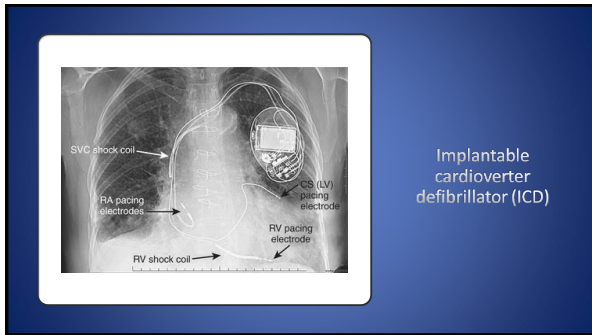
- Confirm**
- St. Jude



Pacemakers

- Sx bradycardia, HB
- Can do on OAC, may hold if low stroke risk
- No bridging
- NO LOVENOX
- Monitor overnight





SICD

- Primary or secondary prevention of SCD in someone who does not need pacing
- Younger patients

The illustration shows a subcutaneous ICD system implanted in the chest wall, with leads extending to the heart.



MICRA

- Medtronic leadless pacemaker
- Length 26 mm (1 inch)
- Indications: Sx brady or HB in AF or when no A lead needed
- Catheter based insertion into RV
- 12-year life
- <https://www.youtube.com/watch?v=R64Fw9zaq-M>

Risk Factor Modification

The images illustrate different risk factors and their modification:

- NIH, 10/18/18: A person's waist circumference is being measured, representing obesity as a risk factor.
- WebMD.com, 10/18/18: A person in bed with a heart rate monitor, representing heart rate and blood pressure monitoring.
- MedlinePlus, 10/18/18: Two glasses of beer, representing alcohol consumption as a risk factor.

Why is AF a growing epidemic?

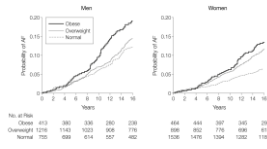
Non-modifiable Risk Factors

- Age
- Male
- Genetics
- Heart/thyroid/kidney disease
- Infection

Modifiable Risk Factors

- HTN
- CAD
- Obesity
- OSA
- ETOH

Garró & Spragg, 2017



- BMI > 30 kg/m² greater risk for AF
- Framingham – obesity increases risk AF 50%

AF and OSA

- Sleep disordered breathing – 4-fold increase in AF (Mullin et al., 2016)
- As severity of OSA increases, so does AF risk (Khalil et al., 2016)
- AF recurrence higher in untreated OSA (Taniguchi et al., 2009)

AF and ETOH

- Alcohol consumption increases risk of AF – 8% per 1 drink per day.
- Risk is greater for men than women
- Liquor and wine worse than beer
- Binge drinking is bad



Risk Factor Modification

AF Clinics

AF Clinics



- CPAP compliance 72% no AF, non-compliant 37% no AF
- ETOH has dose dependent response

Plan B: When to go to hospital

- New palpitations/AFib
- Feeling unwell
- CP, SOB, dizzy, LH
- Severe heart racing
- S/S stroke

Case Review - JB

- Rate vs Rhythm control?
- Ablation candidate?
- Pace & ablate?
- Risk - CHA₂DS₂-VASc = ?
- Age, CAD, CHF, F



References

- Amerena, J. & Ridley, D. (2017). An Update on Anticoagulation in Atrial Fibrillation. *Heart, Lung and Circulation*, 26, 911-917.
- Becattini, C. & Agnelli, G. (2016). Treatment of venous thromboembolism with new anticoagulant agents. *Journal of the American College of Cardiology*, 67(16), 1941-1955.
- Gaasch, W. H. & Konkle, B. A. (2017). Antithrombotic therapy for prosthetic heart valves: Indications. *UpToDate*, July 2017. Downloaded 8/27/17.
- Heidenreich, P. A., Albert, N. M., Chan, P. S., Curtis, L. H., Gergusion, T. B., Fonarow, G. C., ... Varosy, P. D. (2016). 2016 ACC/AHA Clinical Performance and Quality Measures for Adults with Atrial Fibrillation or

References

- Kovacs, R. J., Flaker, G. C., Saxonhouse, S. J., Doherty, J. U., Birtcher, K. K., Cuker, A. ... Williams, K. A. (2015). Practical Management of Anticoagulation in Patients with Atrial Fibrillation. *Journal of the American College of Cardiology*, 65(13), 1340-1360.
- Lip, G. Y. H. (2017). Mechanisms of thrombogenesis in atrial fibrillation. *UpToDate*, July, 2017.
- Manning, W. J., Singer, D. E., Lip, G. Y. H. (2017). Atrial fibrillation: Anticoagulation therapy to prevent embolization. *UpToDate*, July 2017. Downloaded 8/26/17.
- Mozzafarian D, Benjamin EF, Go AS, et al. on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics – 2016 update: a report from the American Heart Association, 2016; 133:e38-e360.

References

- Chugh, S. S., Havmoeller, R., Narayanan, K., Singh, D., Rienstra, M., Benjamin, E. J., ...Murray, C. J. L. (2014). Worldwide epidemiology of atrial fibrillation: A global burden of disease 2010 study. *Circulation*, *129*, 837-847. doi:10.1161/CIRCULATIONAHA.113.005119/-/DC1.
- Ettinger, P. O., Wu, C. F., De La Cruz, C., Weisse, A. B., Ahmed, S. S. & Regan, T. J. (1978). Arrhythmias and the "Holiday Heart": Alcohol associated cardiac rhythm disorders. *American Heart Journal*, *95*, 555-562. doi: [10.1016/0002-8703\(78\)90296-X](https://doi.org/10.1016/0002-8703(78)90296-X)
- Ganz, L. I. & Spragg, D. (2017, October 11). Epidemiology of and risk factors for atrial fibrillation. *Up To Date*. Retrieved from

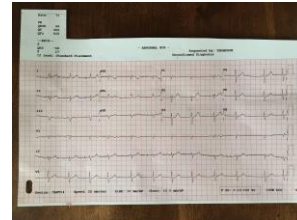
References

- Lim, S. S., Vos, T., Flaxman, A. D., Danaei, G., Shibuya, K., Adair-Rohani, G., ... Memish, Z. A. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor cluster in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, *380*, 2224-2260.
- Tran, H. N., Tafreshi, J., Hernandez, E. A., Pai, S. M., Torres, V. I., & Pai, R. G. (2013). A multidisciplinary atrial fibrillation clinic. *Current Cardiology Reviews*, *9*, 55-62.

Case Study #1

- 75 yo M
- Afib with RVR, failed CVSN, no symptoms
- Hx – EF 60%, DM, HTN, OSA, chronic LH, falls
- What is CHA2DS2-VASc?
- Rate control or rhythm control?

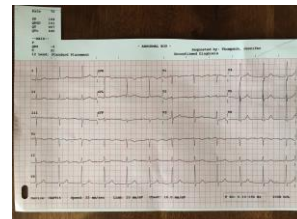
Case # 1



Case #1

- 75 yo M
- Hx: Permanent Afib with rate control strategy
- Rate control with metoprolol tartrate 50 mg BID, Diltiazem 120 mg daily
- Hx – EF 60%, DM, HTN, OSA, chronic LH, falls
– CHA2DS2-VASc = 4
- Falls - Watchman

Case #2



Case #2

- 72 YO M
- Hx – CVA, Persistent AF, SSS, PM
- Sx – extreme fatigue, palpitations
- EF = 60%
- CHA2DS2-VASc = 3 (CVA, age) - Eliquis
- Breakthrough AF on sotalol

Case #2

- PVI
- Uninterrupted Eliquis
- Hold sotalol prior to procedure
- Restart sotalol after PVI

