Atrial fibrillation

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Description

- Atrial fibrillation is the most common dysrhythmia in adults over age forty and is associated with increased morbidity and mortality related to thromboembolic events.

- During this presentation we will discuss rate and rhythm control, anticoagulation as well as left atrial appendage occlusion devices.

- We will use risk calculators to determine risk of thromboembolic events as well as bleeding events.

Objectives

- Describe the basic pathophysiology, risk factors and comorbid conditions related to atrial fibrillation.
- Discuss treatment options for management of atrial fibrillation
- Utilize risk calculators in determining stroke and bleeding risk.
- Analyze atrial fibrillation case studies.

Epidemiology

In 2010 2.7-6.1 million people with atrial fib

- By 2030 estimated up to 12.1 million which is a projected increase of 46%

- Lifetime risk of Atrial fibrillation influenced by:
  - Genetics
  - Hypertension
  - Previous MI

Atrial fib and hospitalization

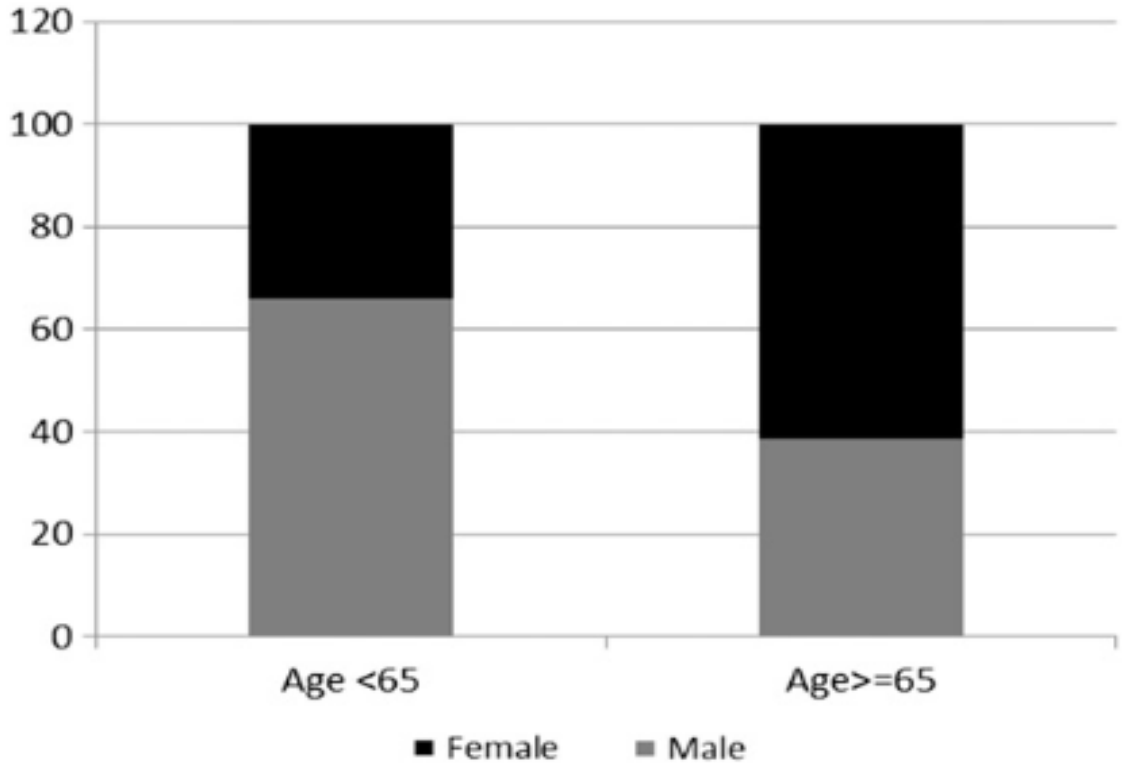


Fig 3 – Percentage of age gender interaction in AF hospitalizations.[43]

Sheikh, A., Patel, N., Nalluri, N., Agnihotri, K., Spagnola, J., Patel, A. …..Paydak, H.
http://dx.doi.org/10.1016/j.pcad.2015.07.002
0033-0620/Published by Elsevier Inc.

Cost of Atrial Fibrillation

- Factors to consider:
  - Diagnostic workup
  - Medications
    - Anticoagulation monitoring if indicated
  - Impact on comorbidities
    - Heart failure
  - Lost productivity

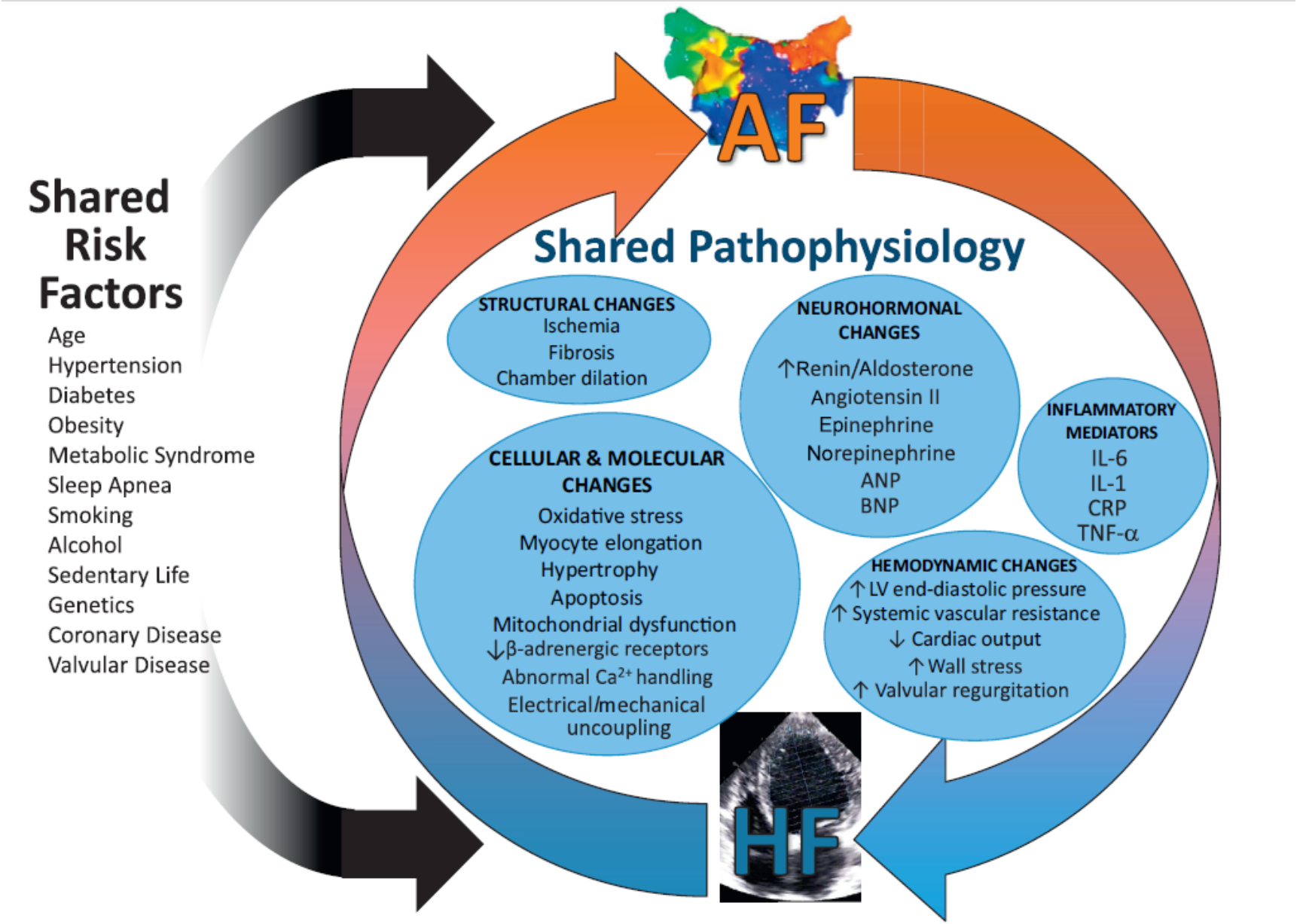
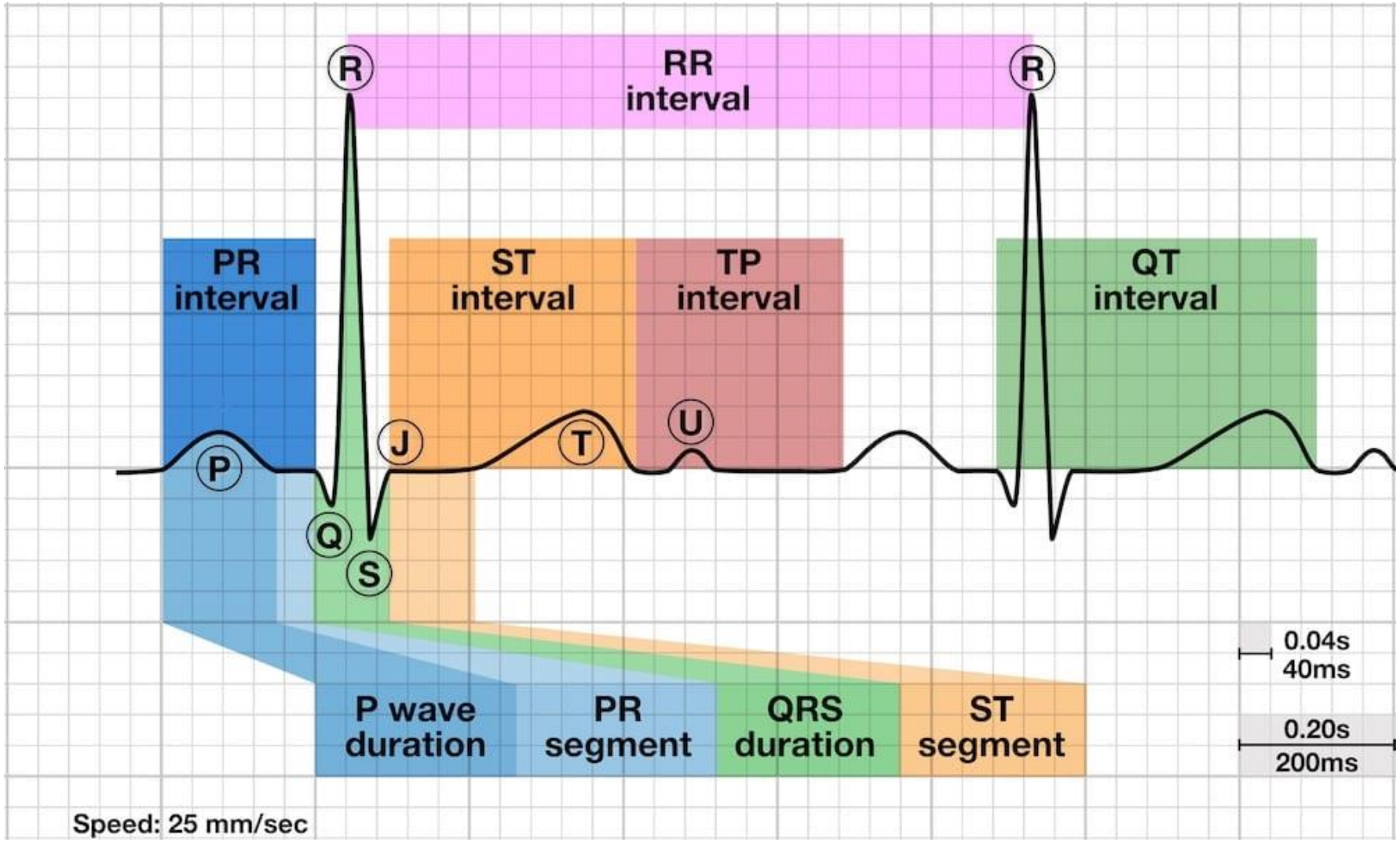


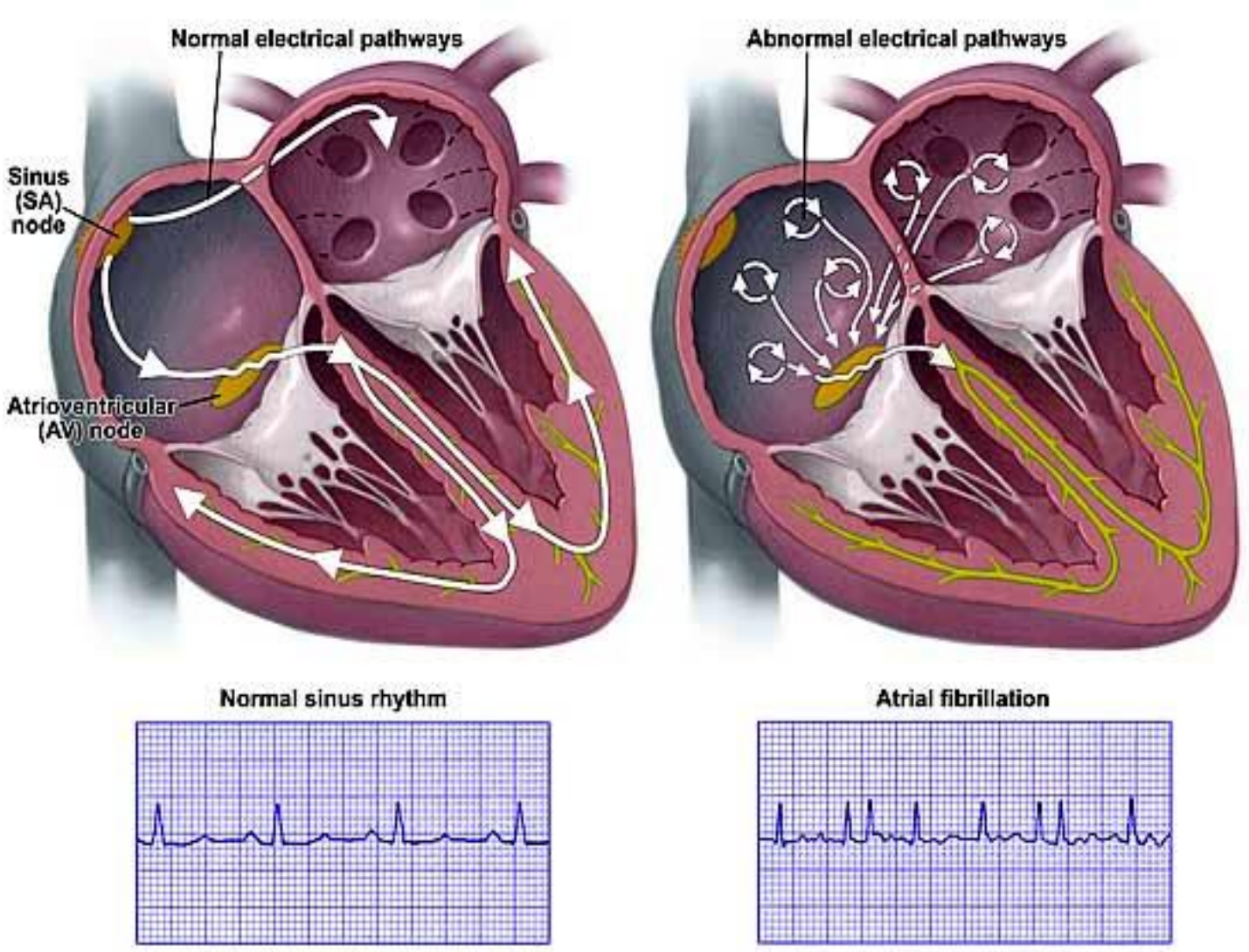
Fig. 1. AF and HF share common risk factors and pathophysiology that lead to the development of each other. CO, cardiac output; CRP, C reactive protein; IL, interleukin; LVEDP, left ventricular end diastolic volume; SVR, systemic vascular resistance; TNF, tumor necrosis factor.

Karnik, A., Gopal, D., Ko, D., Benjamin, E. and Helm, R. Cardiol Clin 37 (2019) 119–129https://doi.org/10.1016/j.ccl.2019.01.00107 33-8651/19/Ó2019 Elsevier Inc

EKG Snapshot

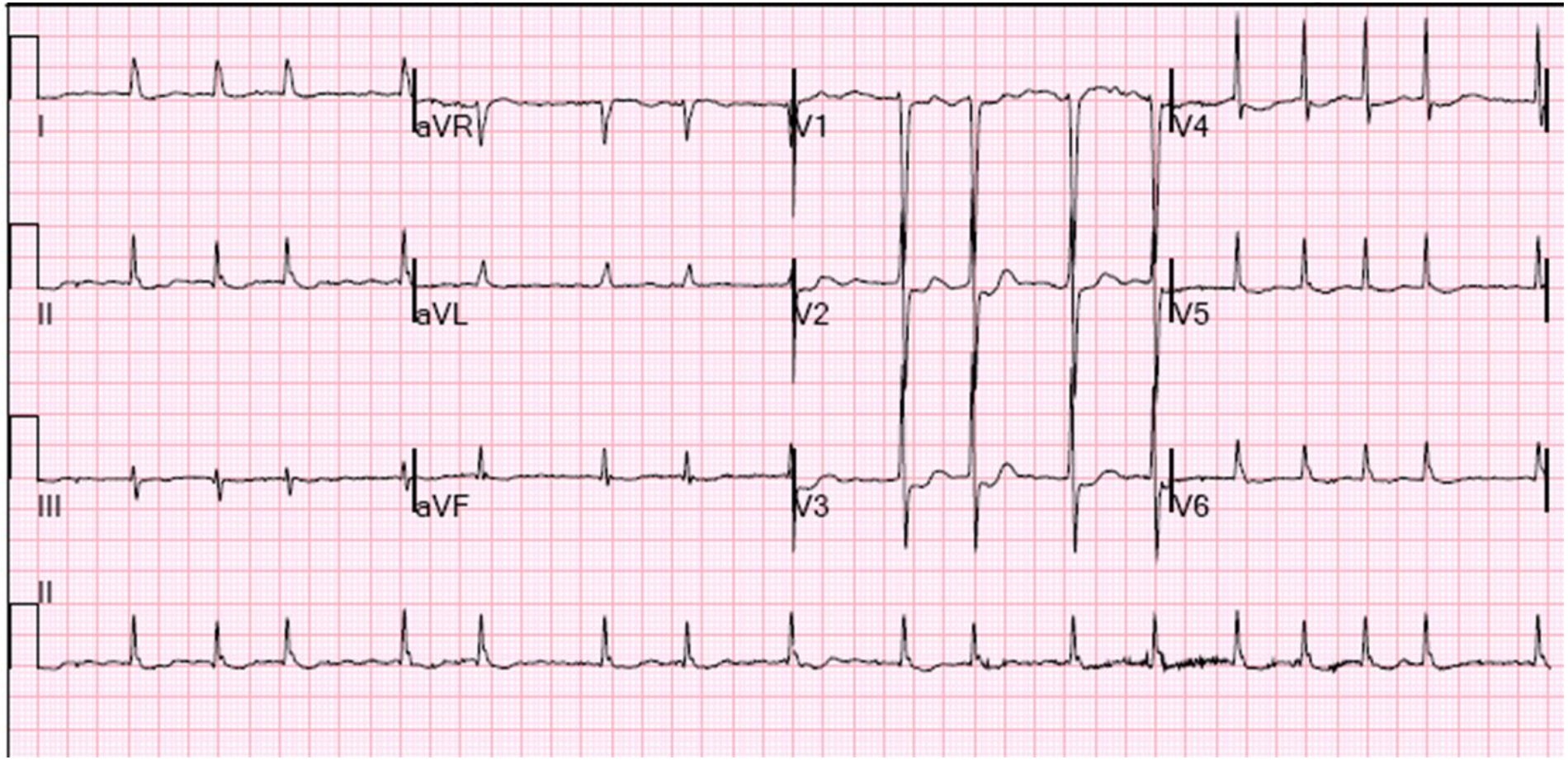


Atrial Fibrillation (AF)



Atrial fibrillation. http://www.health-res.com/EX/07-29-05/atrial-fibrillation-lg.jpg. Accessed July 2012.

What does it look like?



Definitions

- Paroxysmal
  - Recurrent and terminates spontaneously within 7 days
- Persistent
  - Sustained and lasts > 7 days or < 7 days but requires pharmacologic or electrical cardioversion.
- Permanent
  - Lasting greater than 1 year, decision made not to pursue SR.
- Long-standing
  - Lasting greater than 12 months.

Fuster, V. et al, ACC/AHA/ESC 2006 Guidelines for the Management of Patients with Atrial Fibrillation- Executive Summary. *Circulation, 114:* 700-752.

Risk Factors

- Age
- Excessive alcohol use or binge drinking
- Genetic Factors/family history
- Caffeine and other stimulants
- Stress/Fatigue
- Viral infection
- High dose steroids
- Obesity
- Sedentary Lifestyle
- Metabolic syndrome
- Sleep apnea
- Valvular Disease
- Coronary Artery Disease
- Hypertension
- Diabetes Mellitus

Cardiac Comorbidities Associated With Afib

- Hypertension
- Coronary artery disease
- Valvular heart disease
- Heart failure
- Cardiomyopathy
- Pericarditis
- Congenital heart disease
- Cardiac surgery

Ananthapanyasut, W., Napan, S., Rudolph, S., Harindhanavudhi, H., Guglielmi, K., Lerma, E. (2010). Prevalence of Atrial Fibrillation and Its Predictors in Nondialysis Patients with Chronic Kidney Disease. *Clin J Am Soc Nephrol. 5(2):* 173–181.
doi: 10.2215/CJN.03170509

Noncardiac Comorbidities Associated With Afib

- Pulmonary embolism
- Chronic obstructive pulmonary disease (COPD)
- Obstructive sleep apnea
- Hyperthyroidism
- Obesity

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Goals of Acute and Chronic Therapy

- Prevent stroke
- Slow ventricular response
- Restore and maintain normal sinus rhythm
- Improve symptoms
- Improve quality of life
- Reduce cost
- Prolong survival

CHA_2D_2 VASc

Scoring Differences Between $CHADS_2$ and CHA_2DS_2-VASc

	$CHADS_2$ (Maximum score, 6)	CHA_2DS_2-VASc (Maximum score, 9)
Risk Factor	**Points**	**Points**
Congestive heart failure	1	1
Hypertension	1	1
Diabetes	1	1
Vascular disease	N/A	1
Age 65-74	N/A	1
Age ≥75	1	2
Female sex	N/A	1
Previous stroke/TIA	2	2

N/A – not applicable

Journal WATCH

Atrial Fibrillation: Established and Innovative Methods of Evaluation and Treatment. Dtsch Arztebl Int 2012; 109(1-2): 1-7.
DOI: 10.3238/arztebl.2012.0001

HAS-BLED

Letter	Clinical Characteristic	Points
H	Hypertension	1
A	Abnormal Liver or Renal Function	1 or 2
S	Stroke	1
B	Bleeding	1
L	Labile INR	1
E	Elderly (age > 65)	1
D	Drugs or Alcohol	1 or 2
Maximum Score		9

Ruff, C. Which Risk Score Best Predicts Bleeding With Warfarin in Atrial Fibrillation? 2011. https://www.acc.org/latest-in-cardiology/articles/2014/07/18/11/38/which-risk-score-best-predicts-bleeding-with-warfarin-in-atrial-fibrillation

Warfarin in atrial fibrillation

- MOA- Vitamin K antagonist
- Dosing- variable based on INR which should be monitored weekly until target achieved, then monthly.
  - Target INR is 2.0-3.0.
- Onset- 3-5 days after starting to reach its full blood thinning effect.
- Half-Life- up to 40 hrs
- Reversibility- Vitamin K

Direct Oral Anticoagulants for atrial fibrillation

Medication	MOA	Dosing	Onset	Half-Life	Reversibility
Apixaban	Direct factor Xa inhibitor	Oral Twice a day	3 hr	8-15 hr	Andexanet Alfa Subcutaneous
Dabigatran	Direct thrombin inhibitor	Oral Twice a day	2 hr	12-17 hrs	Idarucizumab IV
Edoxaban	Direct factor Xa inhibitor	Oral Once a day	1-2 hrs	10-14 hrs	Andexanet Alfa Subcutaneous
Rivaroxaban	Direct factor Xa inhibitor	Oral Once a day	2-4 hrs	5-9 hrs	Andexanet Alfa Subcutaneous

Strategies to Enhance Anticoagulation Management

Patient

- Education
  - Diet, drugs, diseases, etc
- Engagement
  - Consider home monitoring or anticoagulant that does not require monitoring
- Ongoing patient education to reinforce long-term adherence with therapy

Provider

- Online warfarin dosing calculators to assist with warfarin initiation.
- Partnering with patient, family and nursing to increase time in TTR.
- Increase familiarity with newer anticoagulants.

Home Monitoring

- The Home INR Study (THINRS) to compare methods among 2,922 warfarin-treated patients at VA centers

- Weekly finger-stick INR associated with nonsignificant decrease in bleeding, stroke, or death compared with clinic monitoring (*P*=0.10)

Source: Jacobson AK, et al "A Prospective Randomized Controlled Trial of the Impact of Home INR Testing on Clinical Outcomes: The Home INR Study (THINRS)" *AHA* 2008; Abstract 5217.

Home INR Monitoring

- Home monitoring reduced time outside of therapeutic range by 7%

- “Overall, the findings support home testing as an acceptable alternative to high-quality clinic care or even preferable if patients have difficulty getting to the clinic because of disability or distance.”

Source: Jacobson AK, et al "A prospective randomized controlled trial of the impact of home INR testing on clinical outcomes: The Home INR Study (THINRS)" *AHA* 2008; Abstract 5217.

Selecting an Anticoagulant

Focus is on evaluating risks vs benefits- Class of Recommendation I

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.

- Warfarin (LOE: A)
- Dabigatran (LOE: B)
- Rivaroxaban (LOE: B)
- Apixaban (LOE: B)
- Edoxaban (LOE: B-R)

Initiation of DOAC

- In eligible patients with afib DOACs are recommended over warfarin

Exception- Mechanical heart valve or moderate to severe mitral stenosis

- Baseline evaluation of renal and hepatic function then on annual basis.

- Engage in shared decision making with the patient and/or caregiver regarding treatment options.

Using CHA_2DS_2-VASc for treatment decision

CHA_2DS_2-VASc Score	Gender	Anticoagulate
0	Men	Can Omit
1	Women	Can Omit
1	Men	Consider anticoagulant
2	Women	Consider anticoagulant
2 or greater with CKD or dialysis	Men	Warfarin or apixaban
3 or greater with CKD or dialysis	Women	Warfarin or apixaban
4, 5. 6		Anticoagulate

Special Considerations

- Consider reduced doses of medications in patients with moderate to severe CKD
  - Serum creatinine ≥ 1.5 mg/dL — Apixaban
  - CrCl 15 to 30 mL/min — Dabigatran
  - CrCl ≤50 mL/min — Rivaroxaban
  - CrCl 15 to 50 mL/min — Edoxaban

Bridging and Interrupting Anticoagulation

- Mechanical valve
  - Balance risk of stroke and bleeding
  - Bridge with low molecular weight heparin or unfractionated heparin

- No mechanical valve
  - Balance risk of stroke and bleeding and the duration of time a patient will not be anticoagulated.

  - Bridge with low molecular weight heparin or unfractionated heparin

Electrical Cardioversion

When Afib duration of 48 hrs or longer or duration unknown:

- Anticoagulation with warfarin, a factor Xa inhibitor, or direct thrombin inhibitor for at least **3 weeks before** and at least **4 weeks after** cardioversion, regardless of the CHA_2DS_2-VASc score or the method (electrical or pharmacological) used to restore sinus rhythm.

- When immediate cardioversion is required for hemodynamic instability, anticoagulation should be **initiated as soon as possible** and continued for at least **4 weeks after** cardioversion unless contraindicated

Anticoagulation and Cardioversion

For patients with AFib of less than 48 hours' duration and CHA_2DS_2-VASc score of 2 or greater in men and 3 or greater in women:

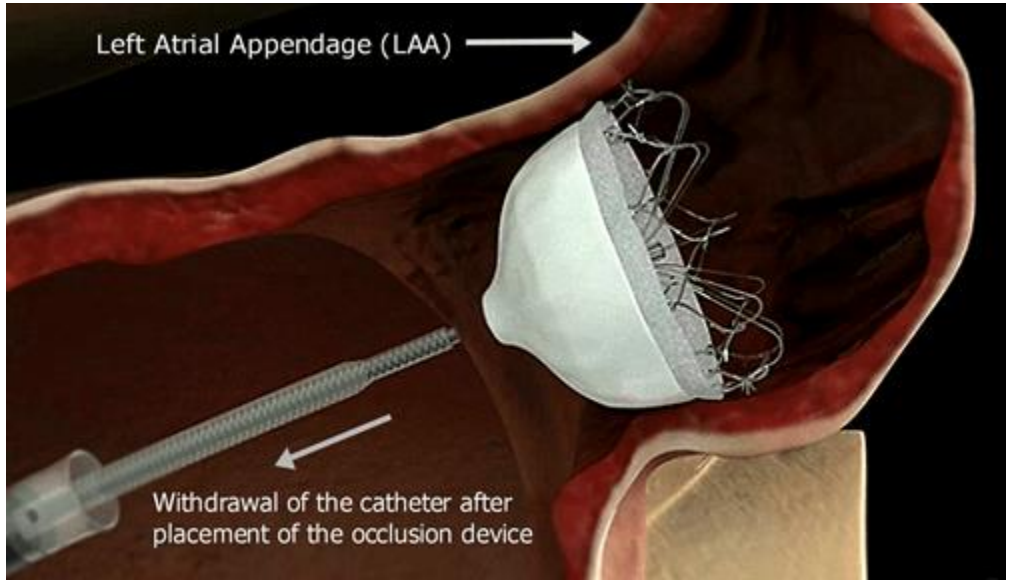
- Heparin, a factor Xa inhibitor, or a direct thrombin inhibitor is reasonable as soon as possible before cardioversion and subsequent long-term anticoagulation therapy.

- After cardioversion for AFib of any duration base anticoagulation therapy on thromboembolic risk profile and bleeding risk profile.

Left Atrial Appendage Occluder

Percutaneous LAA occlusion may be considered in patients with AF at increased risk of stroke who have contraindications to long-term anticoagulation.

- Lariat™
- Watchman™
- Amplatzer cardiac plug™



Consideration for Left Atrial Appendage Occluder

- People that have had some major bleeding issues on coumadin or other NOACs
  - GI bleeds
  - Hemorrhagic strokes

- Patients who are non-compliant on anticoagulant therapy or those with issues regulating their INR.

- People with active lifestyles.
- Elderly or those who are prone to falls.

Contraindications for Left Atrial Appendage Occluder

- Mechanical heart valve
- Current thrombus in the left atrial appendag
- Left atrial appendage opening larger than current device available

Medications beyond anticoagulation

- Rate control
  - Beta blocker
  - Calcium channel blocker (Diltiazem and Verapamil)
  - Digoxin

- Rhythm control (most common)
  - Calcium channel blocker (Diltiazem and Verapamil)
  - Amiodarone
  - Sotalol
  - Dofetilide

Anticoagulation and cardioversion

- Perform transesophageal echocardiography (TEE) for patients with AFib of 48 hours' duration or longer or of unknown duration who have not been anticoagulated for the preceding 3 weeks.

- If no left atrial thrombus is identified, perform cardioversion, provided that anticoagulation is achieved before transesophageal echocardiography and maintained after cardioversion for at least 4 weeks.

Anticoagulation and cardioversion

For patients with AF or atrial flutter of less than 48 hours' duration with a CHA_2DS_2-VASc score of 0 in men or 1 in women

- Administration of heparin, a factor Xa inhibitor, or a direct thrombin inhibitor, OR no anticoagulant therapy, may be considered before cardioversion.

- Postcardioversion oral anticoagulation may not be needed.

Catheter ablation

A procedure which focuses on disrupting electrical signals in the heart by destroying or scarring tissue in the atria.

In patient with symptomatic atrial fib and heart failure with reduced EF (HFrEF) catheter ablation may reduce hospitalizations and lower mortality.

Case 1

HPI- 60 yo male with 3 days of increased fatigue and dyspnea at rest and with exertion. Denies palpitations, chest discomfort or dizziness.

PMH- Htn, OA, BPH, DM

<u>Meds</u>:

HCTZ 25mg daily

Losartan 50mg daily,

Flomax 0.4mg daily,

Naprosyn 500mg bid

Glimepiride 2mg daily

Refuses to take “rat poison”

Recent EKG- atrial fib with rapid ventricular response

Case 1

PE: 124/56 HR 102 RR 18 O2 sat 98%

General : well appearing older Caucasian male in NAD, HEENT: head normocephalic. Conjunctiva pink, sclera anicteric. Mucous membranes moist. Neck veins flat, 2+carotids without bruits.

Chest: Lungs with bibasilar crackles

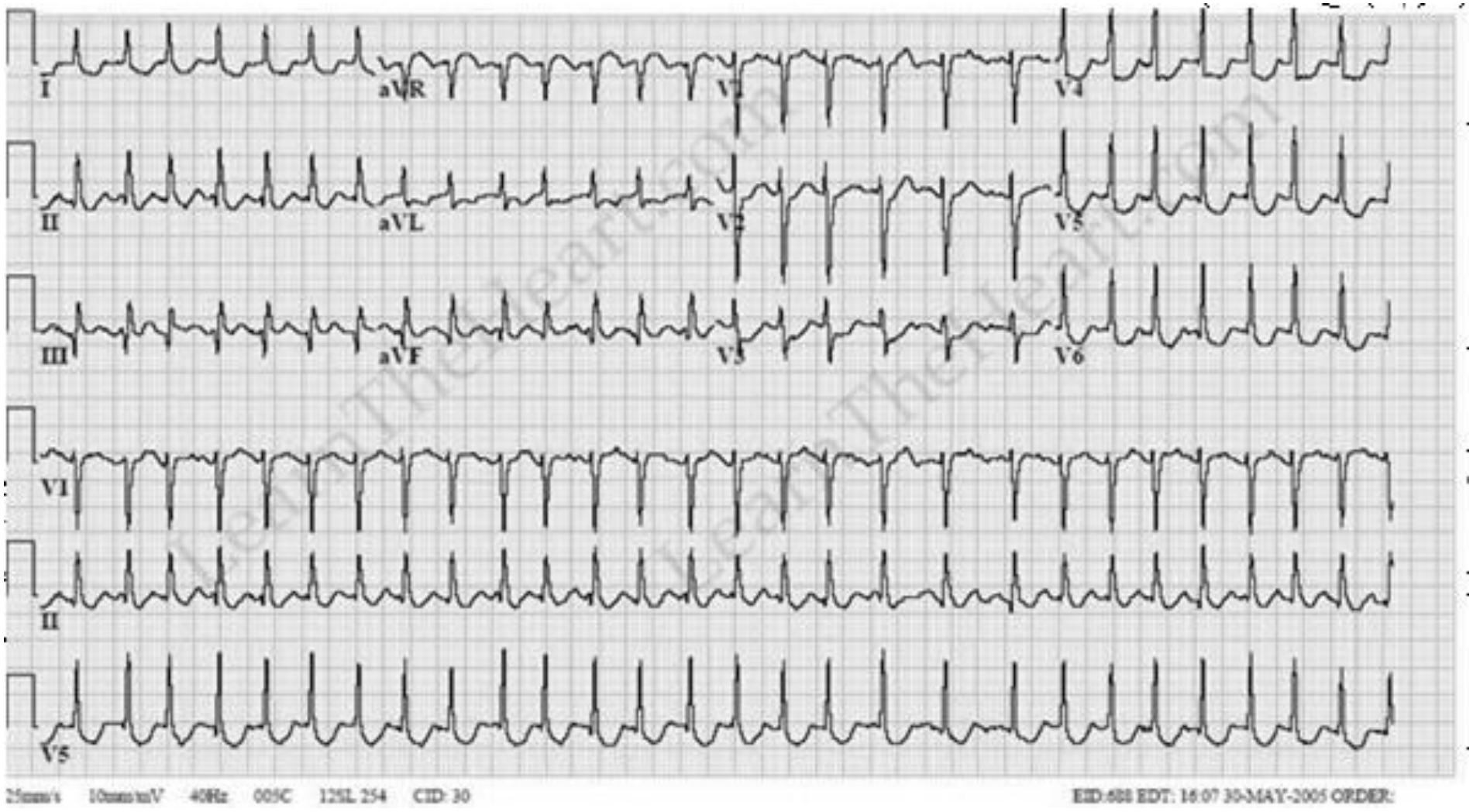
Cardiac: Rapid irregular rate and rhythm. Normal S1 S2 no murmurs

Abdomen: soft, NT, + bowel sounds, without hepatomegaly

Ext: 2+ distal pulses without edema

Skin: warm and dry, no cyanosis , rashes or lesions.

Case 1



http://www.learntheheart.com/AtrialFibrillation.html

Approach to treatment

- Slow down rate
- Risk calculator for stroke and bleeding risk
- Anticoagulate
- Chemical or electrical cardioversion?

Case 2

HPI: 71 yo female discharged to long term care after recent hospitalization. She has a h/o Parkinsonism, OSA, Htn and heart failure with EF 30% and new onset paroxysmal atrial fibrillation. S/P recent hospitalization fluid overload in the setting of paroxysmal atrial fib. She spontaneously converted to sinus rhythm 48 hrs prior to discharge.

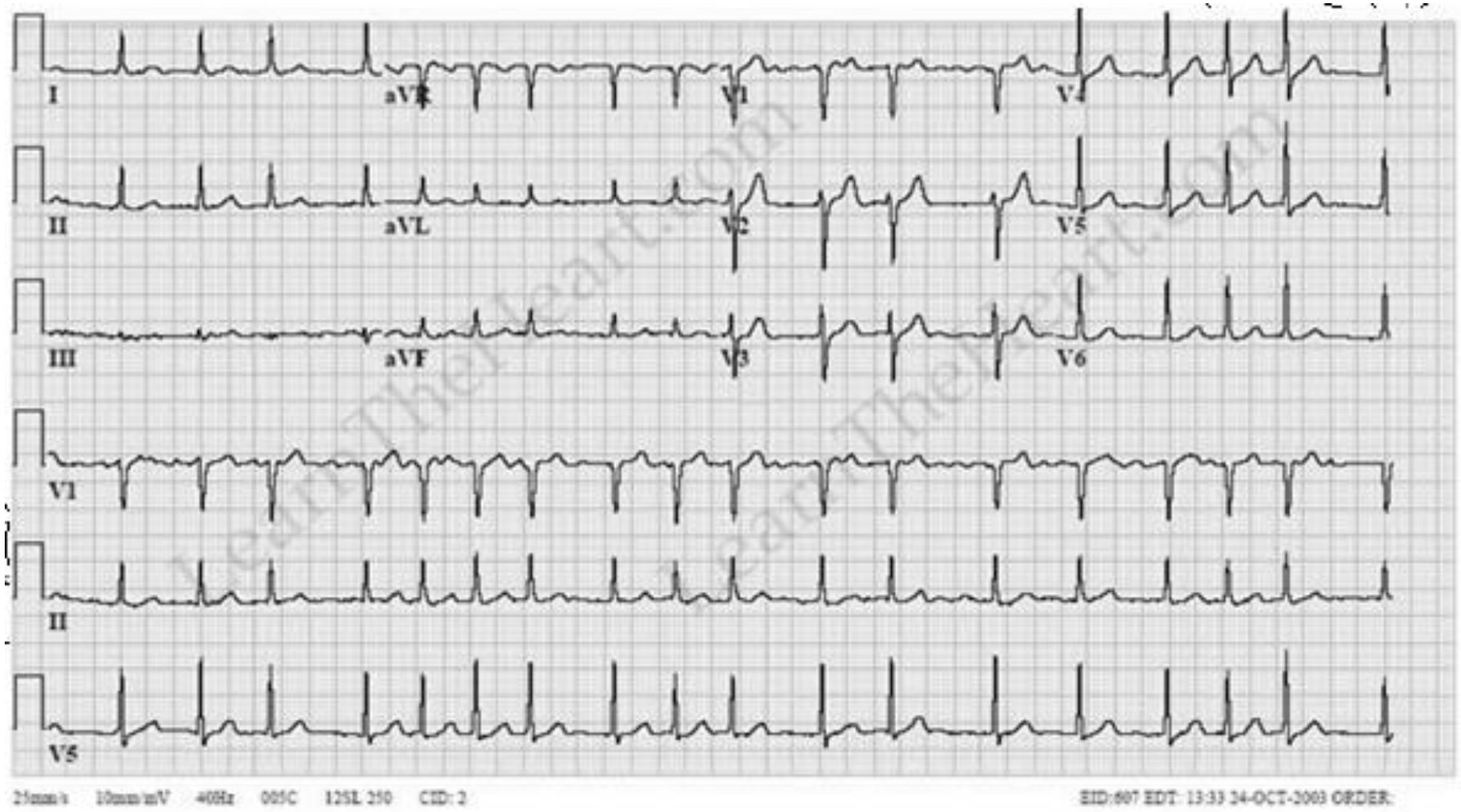
Meds:

- Metoprolol Succinate, Furosemide, Sinemet, Lisinopril, Warfarin, Spironolactone, Peri-colace

Case 2

- PE: 104/86 HR 96 RR 14 O2 sat 99%
- General : frail appearing older African American female in NAD.
- HEENT: head normocephalic. Conjunctiva pink, sclera anicteric. Mucous membranes moist. Neck veins slightly elevated 2cm above the clavicle. 2+carotids without bruits.
- Chest: Lungs without crackles or wheezes.
- Cardiac: Rapid irregular rate and rhythm. Normal S1 S2, 3/6 holosystolic murmur.
- Abdomen: soft, NT, + bowel sounds, without hepatomegaly
- Ext: 2+ distal pulses with trace pitting edema
- Skin: warm and dry, no cyanosis , rashes or lesions.

EKG



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Approach to treatment

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Questions? Margaret.bowers@duke.edu

Bowers personal photo