MANAGEMENT OF ATRIAL FIBRILLATION

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No disclosures
Case #1

A 45 year old male comes in with atrial fibrillation with rapid ventricular response with symptoms of fatigue for the last 2 weeks and exercise intolerance.

Echocardiogram demonstrates normal left ventricular wall thickness and function.

He does not have diabetes, hypertension, congestive heart failure or any vascular disease.

He is found to have hyperthyroidism.
Questions:

Would rhythm control be a reasonable strategy for this patient?

Which agent would you use?

Should you anticoagulate the patient?
Case #2

75 year old female comes in feeling “heart jumping” with atrial fibrillation and rapid ventricular response. She has mild left ventricular dysfunction and atrial dilation at 5.5 cm. She receives metoprolol and rate is controlled. Her daughter asks “are we going to fix her back to the normal rhythm?”

What are your treatment options?

Does the patient need anticoagulation?
Case #3

67 year old male with known compensated cardiomyopathy and has a diagnosis of atrial fibrillation with difficult to control rates. What anti-arrhythmic medications can be tried for this patient?
What are the risk factors for Atrial fibrillation?

Think about the typical patient
Statistics

Most common arrhythmia in the hospital setting

Preventable cause of stroke

Atrial rate > 300 places the patient at risk for atrial thrombus as well as rapid ventricular response

Rapid ventricular response can lead to hypotension, syncope, congestive heart failure, fatigue

Risks are are CAD, CHF, obesity, diabetes, hypertension, age
What have you seen triggering this arrhythmia?

Think about your septic patient in the ICU, what do they have on the monitor prior to atrial fibrillation.
TRIGGERS

Excessive premature atrial beats linked with incidence of atrial fibrillation

These PACs originate at the ostium of the pulmonary veins

Increased sympathetic tone (sepsis, surgery) can trigger atrial fibrillation

Increase parasympathetic tone can also trigger atrial fibrillation (vagally mediated atrial fibrillation occurs due to heterogenous vagal innervation of the atria)
Classification

Paroxysmal - terminates within 7 days

Persistent - Past 7 days

Permanent - over 12 months

Recurrence is however 70% with 90% unrecognized by the patient and 17% lasting over 48 hours

Prevention- some evidence that weight loss, mediterranean diet high in olive oil, vitamin C (post op), nuts can reduce risk
Do you think your patients have recurrence of the arrhythmia?
Recurrence rates

Upto 70% at 1 year

Majority of the episodes are asymptomatic even when 17% are over 48 hours in duration

At 5 years 25% of patients will have permanent atrial fibrillation

Patients with left ventricular dysfunction, hypertension, advanced age and enlarged atria are likely to have recurrence
New onset AFIB

Symptomatic due to RVR
  - Rate control (primary symptomatic from this)
  - Rhythm control

Treatment for reduction in thrombus embolization
  - Asa
  - Anticoagulation
How do you determine who to anticoagulate?
Prevention of embolization

CHA2DS2-VASc score is calculated to guide anticoagulation

All patients undergoing pharmacological or DC cardioversion need anticoagulation at least short term
CHADS2-VASC score

Congestive heart failure 1
Hypertension 1
Age >= 75 2
Stroke/tia 2
Diabetes 1
Vascular disease (including aortic plaque) 1
Age 65 to 74 1
Female sex 1
Anticoagulation

Embolization can occur with paroxysmal, permanent or persistent atrial fibrillation.

Warfarin reduces risk of cerebrovascular accident if score >=2.

Anticoagulation reduces cerebrovascular accident by \( \frac{2}{3} \).

There is 0.4% risk of serious bleeding but this is less than stroke risk.
NOAC compared to warfarin

Reduce risk of stroke and bleeding

Significant reduction in hemorrhagic stroke which many times is fatal

Dabigatran has increased risk of gastrointestinal bleeding
What about aspirin and clopidogrel?
Aspirin monotherapy

Even with CHADS2 score of 0 not been studied adequately

2007 meta analysis demonstrated a 20% risk reduction in CVA but not statistically significant

Did not reduce disabling stroke

In one observational study there is higher incidence of stroke compared to no therapy
**Aspirin + Clopidogrel**

Active A trial demonstrated superiority to aspirin alone.

Active W trial demonstrated warfarin superior.

Turns out bleeding risk of dual antiplatelet therapy is similar to warfarin anticoagulation and NOACs have less bleeding in comparison to dual antiplatelet therapy so if a patient can take aspirin + clopidogrel, they can take anticoagulation.
BRIDGING FOR WARFARIN

Not necessary in patient without history of thromboembolism

In patients who present with cerebrovascular accident the net benefit with heparin bridging is neutral when combined with the ICH risk
NOAC dosing

Dabigatran (Pradaxa) 150 mg by mouth twice a day is typical dose if normal renal function. There is antidote.

Edoxaban 60 mg by mouth daily if GFR > 50

Apixaban 5 mg by mouth twice a day

Rivaraxiban 20 mg by mouth daily
Should we be starting amiodarone drips on everyone?
Rate vs rhythm control

Most patients are symptomatic from RVR and therefore rate control needs to be achieved in all patients short term.

Long term rhythm vs rate control needs to be decided using antiarrhythmic, catheter or surgical ablation +/- cardioversion.

For rate control beta blocker and calcium channel blocker is used.
Rate control vs rhythm control

Associated with similar morbidity and mortality

Treatment choice driven by symptomatic status and evidence of structural heart disease due to tachycardia

Some patients are difficult to rate control and rhythm control strategy may be useful

No data to suggest that preventing episodes of atrial fibrillation reduces mortality
AFib presentation

1. Asymptomatic, diagnosed on electrocardiogram

2. Acutely ill patient in the hospital such as sepsis, cardiac surgery, myocardial infarction

3. Arterial embolism presentation

4. Symptomatic a. From the rapid ventricular response with shortness of breath, palpitations or fatigue b. The atrial fibrillation itself with decreased exercise capacity
Immediate issues

Rapid ventricular response with hypotension needs emergent cardioversion however at the risk of systemic embolization.

Congestive heart failure, ischemia may need rate control immediately.

Prompt anticoagulation if no contraindications.
**Work up**

- TSH for hyperthyroidism
- Cardiac enzymes
- BNP for congestive heart failure
- Chest X-ray for same
- Echocardiogram for structural heart disease
**Rate Control**

Goal should be to get heart rate < 110

Calcium channel blocker or beta blocker can be used

Amiodarone may be needed for rate control in some resistant patients however at the risk of thromboembolism if cardioversion occurs and risk of toxicity

Digoxin may be used in patients with systolic congestive heart failure however in patients without systolic congestive heart failure it is linked with higher mortality
Restoration of sinus rhythm

Reasonable to have 1 attempt at maintaining sinus rhythm especially if there is a reversible cause such as infection, surgery, hyperthyroidism

In such patients who do not have the substrate for further atrial fibrillation episodes it may reduce symptoms in future, they may not have a second episode

Afib promotes further atrial fibrillation and therefore earlier cardioversion has higher success rate

Best time < 48 hours of onset without TEE or > 48 hours with TEE or wait 3 weeks
Ablation

Second line to antiarrhythmic for maintaining SR in symptomatic atrial fibrillation patients

Success rate at maintaining sinus rhythm at 1 year is about 80%

Long term studies are not available to see if it reduces the risk of stroke
Cardioversion technique

DC

Pharmacological

Combined above
AFFIRM trial - Rhythm versus rate control

Randomized 4000 patients to rate versus rhythm control

Trend towards lower mortality in the rate control arm

Patients with congestive heart failure and age over 65 had a statistically significant lower mortality

There was reduced hospitalization in the rate control arm

No difference in stroke
RACE trial demonstrated similar findings

No significant difference in quality of life

No difference in mortality

However, both trials allowed for stopping anticoagulation 4 weeks after restoring sinus rhythm

In real world registry however there was similar rate of mortality and strokes as the 2 trials enrolled older patients and rhythm control may be useful in younger patients
Patients not good candidate for rhythm control

Asymptomatic > 75 years of age (high risk of recurrence)

Patients in permanent atrial fibrillation

Patients with marked dilation of left atrium
Indications for rhythm control

Persistent symptoms despite rate control

Inability of obtain good rate control

No evidence that shows rates of survival or thromboembolism is improved with rhythm control

Cardioversion in young patients

After cardioversion, beta blocker is recommended and not antiarrhythmic in those patients with transient cause
Cardioversion

Can be done without TEE if documented < 48 hours in onset

3 weeks of anticoagulation prior to cardioversion if > 48 hours or use TEE

4 weeks post cardioversion patient should be anticoagulated regardless of long-term risk
ANTI-ARRHYTHMICS

Class IC agents (flecainide or propafenone) needs to be used with a CCB or BB due to risk of RVR.

Patients may use pill in the pocket approach with propafenone if infrequent afib episodes.

Most common agents: - amiodarone - dofetilide
- flecainide - propafenone
- sotalol
Without structural heart disease

Flecainide and propafenone are the agents of choice.
With structural heart disease

-Amiodarone: Highest efficacy at the risk of highest toxicity with liver and thyroid damage

-Dronedarone: Less toxicity in comparison to above but not as efficacious as amiodarone or sotalol

-Sotalol: More efficacious than dronedarone but patient needs to be monitored for 3 days. Can be used in patients with coronary artery disease. Not recommended if LV wall thickness > 1.4 cm on echo, increases mortality in CHF

-Flecainide and propafenone are contraindicated
WHAT ABOUT PATIENTS UNDERGOING PCI?

NEJM Dec 2016

Trial randomizing over 2000 patients to:

rivaroxiban (Xarelto) at 15 mg daily with P2Y12 inhibitor (clopidogrel)

Very low dose Xarelto 2.5 mg mg by mouth twice a day (not available in US) and dual antiplatelet therapy

Warfarin with dual antiplatelet therapy
Results

The rates of clinically significant bleeding were lower in the two groups receiving rivaroxaban than in the group receiving standard therapy (16.8% in group 1, 18.0% in group 2, and 26.7% in group 3.

The rates of death from cardiovascular causes, myocardial infarction, or stroke were similar in the three groups (Kaplan–Meier estimates, 6.5% in group 1, 5.6% in group 2, and 6.0% in group 3; P values for all comparisons were nonsignificant).
Conclusion

In participants with atrial fibrillation undergoing PCI with placement of stents, the administration of either low-dose rivaroxaban plus a P2Y12 inhibitor for 12 months or very-low-dose rivaroxaban plus DAPT for 1, 6, or 12 months was associated with a lower rate of clinically significant bleeding than was standard therapy with a vitamin K antagonist plus DAPT for 1, 6, or 12 months.

The three groups had similar efficacy rates, although the observed broad confidence intervals diminish the surety of any conclusions regarding efficacy.
Nonpharmacological

Most patients with afib should receive anticoagulation but not all patients are candidates due to bleeding risk.

Catheter ablation of the afib has not been proven to prevent systemic embolization as the long term success rate is 50-85%.

LAA is the usual source of thrombus with 90% of thrombus originating here.

LAA exclusion procedures that physically prevent thrombus embolization have been developed for this purpose.
Patient selection

Patients at high risk of bleeding, inconvenience
Gastrointestinal bleeding
ICH in the past
Compliance
Falls
Coagulation defects or anemia that increase risk of bleeding
Patients however need to take anticoagulation for 6 weeks
**WATCHMAN DEVICE**

For patients who are high-risk for systemic embolization but need long-term anticoagulation the Watchman device can be considered.

This device has been shown to have similar safety and efficacy compared to long-term anticoagulation for prevention of stroke and systemic embolization.

This device is a nitinol cage deployed in the left atrial appendage using a transseptal approach.

The device is covered by a layer of membrane which is endothelialized within 45 days.
Watchman device

Plane of maximum diameter distal to ostium

Fixation barbs engage LAA wall
PROTECT AF TRIAL

Over 700 patients were randomly assigned in at 2 to 1 ratio to either device or long-term anticoagulation.

Patients were anticoagulated for a minimum of 45 days followed by aspirin and clopidogrel for 6 months.

After a mean follow up of 2.3 years the device was shown to be non-inferior to warfarin.

At 3.8 years there was also noted to be a 60% relative risk reduction of cardiovascular death driven by hemorrhagic stroke.

Other devices being studied.
Rhythm control may be a reasonable strategy in this patient who is symptomatic

Class IC antiarrhythmic along with beta blocker or calcium channel blocker can be used since patient has no structural heart disease

A cardioversion should be performed with TEE since onset is over 48 hours

Patient needs to be anticoagulated for 4 weeks minimum

May consider ablation if AA fail
Answers to Case #2

The patient is symptomatic probably from rapid ventricular response and rate is easily controlled.

The probability of maintaining sinus rhythm is lower due to left ventricular dysfunction and left atrial dilation.

Patient needs to be anticoagulated.

If patient is well controlled with rate control strategy it may be superior to rhythm control in an elderly patient.
Answer to case #3

Amiodarone, dofetilide along with dronedarone can be used for this patient.

At his age, ablation can be discussed as well.

If he has recent exacerbation of congestive heart failure, dronedarone should be avoided.
Thank you