Common Problems in Cardiology

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Topics

• CAD
  • Acute coronary syndrome
  • Stable CAD

• Congestive heart failure

• Arrhythmias/syncope/SCD

• Valvular heart disease/IE/Rheumatic fever

• Others: Pericardial disease, Aortic disease, Pregnancy-related, Preoperative Evaluation
Acute Coronary Syndrome

- Acute STEMI
- Non-STE-ACS
  - Non-STE-MI
  - Unstable angina
Acute Coronary Syndrome

- Acute STEMI
  - Fibrinolysis or primary PCI

- Non-STE-ACS
  - Moderate to high risk
    - CAG ± Revascularization
  - Low risk
    - Risk stratification (Ischemia-guided)

Dual Antiplatelets + Antithrombotic
Acute STEMI (<12 hrs)

First medical contact to PCI time

≤120 min

Primary PCI

Contra I/D fibrinolysis
Cardiogenic shock

Successful

Pharmacoinvasive
(preferably CAG 3-24 hrs)
(ESC-I, AHA IIa/IIb)

Fibrinolysis

Fail

Rescue PCI

Noninvasive test
(Ischemia-driven: AHA I)
Acceptable fibrinolysis to primary PCI delay also depends on patient’s baseline risk and symptom onset.

Onset chest pain < 2 hrs:
Acceptable delay for PPCI is 60 minutes (Class IIb, LOE C-LD)

Onset chest pain > 6 hrs:
Acceptable longer delay for PPCI (>120 min)

Fibrinolysis becomes significantly less effective > 6 hours after symptom onset.
## Contraindications to fibrinolytic therapy

<table>
<thead>
<tr>
<th>Absolute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous intracranial haemorrhage or stroke of unknown origin at any time.</td>
</tr>
<tr>
<td>Ischaemic stroke in the preceding 6 months.</td>
</tr>
<tr>
<td>Central nervous system damage or neoplasms or atrioventricular malformation.</td>
</tr>
<tr>
<td>Recent major trauma/surgery/head injury (within the preceding 3 weeks).</td>
</tr>
<tr>
<td>Gastrointestinal bleeding within the past month.</td>
</tr>
<tr>
<td>Known bleeding disorder (excluding menses).</td>
</tr>
<tr>
<td>Aortic dissection.</td>
</tr>
<tr>
<td><strong>Non-compressible punctures in the past 24 h (e.g. liver biopsy, lumbar puncture).</strong></td>
</tr>
</tbody>
</table>
## Contraindications to fibrinolytic therapy

<table>
<thead>
<tr>
<th>Relative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient ischaemic attack in the preceding 6 months.</td>
</tr>
<tr>
<td>Oral anticoagulant therapy.</td>
</tr>
<tr>
<td>Pregnancy or within 1 week postpartum.</td>
</tr>
<tr>
<td>Refractory hypertension (systolic blood pressure &gt; 180 mmHg and/or diastolic blood pressure &gt; 110 mmHg).</td>
</tr>
<tr>
<td>Advanced liver disease.</td>
</tr>
<tr>
<td>Infective endocarditis.</td>
</tr>
<tr>
<td>Active peptic ulcer.</td>
</tr>
<tr>
<td>Prolonged or traumatic resuscitation. &gt;10 min</td>
</tr>
</tbody>
</table>
Non-STE ACS

Moderate to High risk:
Invasive strategy

Urgent (<2 hr)
- Hemodynamic instability
- Life-threatening ventricular arrhythmias
- Refractory angina
- Acute heart failure with ST deviation
- Transient ST-elevation
- Mechanical complications of MI

Early invasive (<24 hr)
- Troponin rising
- Dynamic ST-T changes
- GRACE > 140

Delayed Invasive (<72 hr)
- Unstable angina with GRACE 109-140
- Recent PCI/ prior CABG
- LVEF < 40%
- Post-MI angina
- DM, CRF (eGFR < 60)

Low risk:
Selective invasive strategy

Non-invasive stress test
- Unstable angina (GRACE < 108)
- No intermediate/high risk criteria

ESC 2015 Non-STEMI
Dual Antiplatelets in Acute Coronary Syndrome

- Aspirin
- P2Y12 inhibitors
  - Clopidogrel
  - Ticagrelor
  - Prasugrel (known coronary anatomy in NSTE-ACS)

Faster and greater platelet inhibition
Lower rate of CV death/MI/stroke
Favorable than clopidogrel
Non-STE ACS

Dual antiplatelets + Antithrombin

Dual Antiplatelets

- ASA 300 mg
  - then 81 mg/d

- Ticagrelor / Prasugrel
- Clopidogrel

Antithrombin

- Fondaparinux
- Enoxaparin/UFH

ESC Guideline 2015
Antithrombotic Treatment

1. Fondaparinux: Selective inhibitor of Factor Xa
   - Similar efficacy as enoxaparin but **less bleeding** than enoxaparin
   - Recommended as having the **most favourable efficacy–safety** profile regardless of the management strategy
   - Requires UFH loading at the time of PCI to prevent catheter thrombosis
   - Contraindicated in CrCl<20-30
   - Duration: until d/c, until PCI, up to 8 days

2. Enoxaparin: Low molecular weight heparin
   - Enoxaparin reduced recurrent ischemic events compared to UFH
   - Dose: 1mg/kg sc bid (CrCl<30: 1 mg/kg sc od)
   - Duration: until d/c, until PCI, up to 8 days

3. Unfractionated heparin
   - Dose: Loading 60 u/kg then 12 u/kg/hr
   - Duration 48 hrs or until PCI
Glycoprotein IIb/IIIa inhibitors (IV antiplatelets)

No Class I indication in ACS!!!

- STEMI (Primary PCI): IV GP IIb/IIIa receptor antagonists in conjunction with UFH or bivalirudin in selected patients (Class IIa)

- Non-STE ACS: GP IIb/IIIa inhibitor can be considered in patients treated with an early invasive strategy and DAPT with high-risk features (e.g., positive troponin) (Class IIb)
**Clinical pre-test probabilities in stable chest pain symptoms**

<table>
<thead>
<tr>
<th>Age</th>
<th>Typical angina Men</th>
<th>Typical angina Women</th>
<th>Atypical angina Men</th>
<th>Atypical angina Women</th>
<th>Non-anginal pain Men</th>
<th>Non-anginal pain Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>30–39</td>
<td>59</td>
<td>28</td>
<td>29</td>
<td>10</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>40–49</td>
<td>69</td>
<td>37</td>
<td>38</td>
<td>14</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>50–59</td>
<td>77</td>
<td>47</td>
<td>49</td>
<td>20</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>60–69</td>
<td>84</td>
<td>58</td>
<td>59</td>
<td>28</td>
<td>44</td>
<td>17</td>
</tr>
<tr>
<td>70–79</td>
<td>89</td>
<td>68</td>
<td>69</td>
<td>37</td>
<td>54</td>
<td>24</td>
</tr>
<tr>
<td>&gt;80</td>
<td>93</td>
<td>76</td>
<td>78</td>
<td>47</td>
<td>65</td>
<td>32</td>
</tr>
</tbody>
</table>

- **Pre-test probability <15% → investigate other causes**
  - **Women:** Atypical angina age < 50 / Non-anginal pain age < 60

- **Pre-test probability >85% → Dx SCAD established**
  - Typical angina in men age ≥ 70
  - Typical angina in EF < 50%

- **Pre-test probability 15-85% → noninvasive testing**

ESC Guideline 2014 Myocardial Revascularization
<table>
<thead>
<tr>
<th>Test</th>
<th>Diagnosis of CAD</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sensitivity (%)</td>
<td>Specificity (%)</td>
</tr>
<tr>
<td>Exercise ECG</td>
<td>45–50</td>
<td>85–90</td>
</tr>
<tr>
<td>Exercise stress echocardiography</td>
<td>80–85</td>
<td>80–88</td>
</tr>
<tr>
<td>Exercise stress SPECT</td>
<td>73–92</td>
<td>63–87</td>
</tr>
<tr>
<td>Dobutamine stress echocardiography</td>
<td>79–83</td>
<td>82–86</td>
</tr>
<tr>
<td>Dobutamine stress MRI</td>
<td>79–88</td>
<td>81–91</td>
</tr>
<tr>
<td>Vasodilator stress echocardiography</td>
<td>72–79</td>
<td>92–95</td>
</tr>
<tr>
<td>Vasodilator stress SPECT</td>
<td>90–91</td>
<td>75–84</td>
</tr>
<tr>
<td>Vasodilator stress MRI</td>
<td>67–94</td>
<td>61–85</td>
</tr>
<tr>
<td>Coronary CTA</td>
<td>95–99</td>
<td>64–83</td>
</tr>
<tr>
<td>Vasodilator stress PET</td>
<td>81–97</td>
<td>74–91</td>
</tr>
</tbody>
</table>
Non-invasive Testing for Diagnosis of SCAD

• Stress **imaging** is recommended as the initial test option if local expertise and availability permit: Preferred in:
  – Pre-test probability 66-85%
  – EF<50% without typical angina
  – Prior coronary revascularization

• Exercise ECG is recommended as the initial test in patients with PTP of CAD 15-65%, free of anti-ischemic drugs.

• Coronary CTA should be considered in
  – Patients within PTP 15-50% after a non conclusive exercise ECG or stress imaging test
  – Patients who have contraindications to stress testing
CAG in stable CAD:
1. Medical failure 2. High-risk from non-invasive test
# Indications for diagnostic testing in patients with suspected CAD and stable symptoms

<table>
<thead>
<tr>
<th>Anatomical detection of CAD</th>
<th>Asymptomatic&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Symptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Level&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Invasive angiography</td>
<td>III</td>
<td>A</td>
</tr>
<tr>
<td>CT angiography&lt;sup&gt;f, g&lt;/sup&gt;</td>
<td>III</td>
<td>B</td>
</tr>
<tr>
<td>Functional test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress echo</td>
<td>III</td>
<td>A</td>
</tr>
<tr>
<td>Nuclear imaging</td>
<td>III</td>
<td>A</td>
</tr>
<tr>
<td>Stress MRI</td>
<td>III</td>
<td>B</td>
</tr>
<tr>
<td>PET perfusion</td>
<td>III</td>
<td>B</td>
</tr>
</tbody>
</table>

ESC Guideline 2014 Myocardial Revascularization
Topics

- CAD
  - Acute coronary syndrome
  - Stable CAD
- Congestive heart failure
- Arrhythmias/syncope/SCD
- Valvular heart disease/IE/Rheumatic fever
- Others: Pericardial disease, Aortic disease, Pregnancy-related, Preoperative Evaluation
Heart Failure

- LVEF ≤ 40%: HF with reduced EF (HFrEF)
- LVEF 41-49%: Borderline
- LVEF ≥ 50%: HF with preserved EF (HFpEF)
Causes of HFrEF

- Ischemic
- Non-ischemic
Causes of non-ischemic HFrEF

1. Familial cardiomyopathy
2. Idiopathic DCM
3. Inflammation
   - Infection (Viral myocarditis, HIV, Chagas’ disease)
   - Non-infectious (Connective tissue disease, hypersensitivity, sarcoidosis)
4. Infiltrative
   - Hemochromatosis, amyloidosis
5. Tachycardia-induced cardiomyopathy
6. Toxic cardiomyopathy
   - Alcohol, cocaine, cancer therapies, other toxins, nutritional deficiencies
7. Endocrine and Metabolic
   - Obesity, DM, thyroid, Growth hormone excess/deficiency
8. Stress Cardiomyopathy
9. Peripartum cardiomyopathy

Prevalence of potentially reversible nonischemic cardiomyopathy: 20% to 50%
Alcoholic cardiomyopathy: How much is too much?

The risk of asymptomatic alcoholic cardiomyopathy is increased in those consuming >90 g of alcohol per day for >5 years.

Definition of Familial cardiomyopathy?

Defined as ≥2 relatives with idiopathic DCM
In pts with idiopathic DCM, a 3-generational family history should be obtained to aid in establishing the diagnosis of familial DCM.
### Pharmacological treatments in HFrEF

**Neurohormonal blockage***

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>An ACE inhibitor is recommended, in addition to a beta-blocker, for all patients with an EF ≤40% to reduce the risk of HF hospitalization and the risk of premature death.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>A beta-blocker is recommended, in addition to an ACE inhibitor (or ARB if ACE inhibitor not tolerated), for all patients with an EF ≤40% to reduce the risk of HF hospitalization and the risk of premature death.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>An MRA is recommended for all patients with persisting symptoms (NYHA class II-IV) and an EF ≤35%, despite treatment with an ACE inhibitor (or an ARB if an ACE inhibitor is not tolerated) and a beta-blocker, to reduce the risk of HF hospitalization and the risk of premature death.</td>
<td>I</td>
<td>A</td>
</tr>
</tbody>
</table>

**Reduce HF hospitalization and death**

- **ACEI**: EF≤40%, Fc I-IV
- **BB**: EF≤40%, Fc I-IV
- **MRA**: EF≤35%, Fc II-IV
How to slow heart rate:

- Beta-blocker
- Ivabradine
- $I_f$ Channel inhibitor
Hospitalization for worsening heart failure

Sinus rate $\geq 70$ bpm, LVEF $< 35\%$, optimal Rx

HR = 0.74 (0.66–0.83)
$P < 0.0001$

26% RRR

HR Target in systolic heart failure

Sinus rhythm and HR $\geq 70$ beats/min?

Yes $\rightarrow$ ADD ivabradine

No $\rightarrow$

Still NYHA class II–IV and LVEF $\leq 35$%?

Yes $\rightarrow$ Sinus rhythm and HR $\geq 70$ beats/min?

No $\rightarrow$ Still NYHA class II–IV and LVEF $\leq 35$%?

Yes $\rightarrow$ CRT-P/CRT-D

No $\rightarrow$ QRS duration $\geq 120$ ms?

Yes $\rightarrow$ Consider CRT-P/CRT-D

No $\rightarrow$ Consider ICD

Still NYHA class II–IV?

Yes $\rightarrow$ No further specific treatment

No $\rightarrow$ No further specific treatment

Still NYHA class II–IV and LVEF $\leq 35$%?

Yes $\rightarrow$ No further specific treatment

No $\rightarrow$ No further specific treatment

Consider digoxin and/or H-SDN

If end stage, consider LVAD and/or transplantation
Implantable Cardioverter-Defibrillators

Secondary Prevention:
Post-cardiac arrest (VT/VF) or Stable VT in structural heart disease without *completely* reversible cause

Primary Prevention:
Symptomatic heart failure with LVEF<35%
(exclude post-MI<40 days, recent revascularization)

Contraindications of ICD: Life expectancy < 1 yr, VT/VF storm, NYHA IV, Significant psychiatric illnesses
**ESC/AHA guideline : CRT indication**

NYHA II-(ambu)IV, EF<35%, QRS > 120 msec

<table>
<thead>
<tr>
<th>BBB</th>
<th>QRSd</th>
<th>Class (LOE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBBB</td>
<td>&gt;150 ms</td>
<td>I (A)</td>
</tr>
<tr>
<td>LBBB</td>
<td>120-150</td>
<td>I (B) (AHA - class IIa)</td>
</tr>
<tr>
<td>Non-LBBB</td>
<td>&gt;150</td>
<td>IIa (B)</td>
</tr>
<tr>
<td>Non-LBBB</td>
<td>120-150</td>
<td>IIb (B) (AHA-class III if NYHA II)</td>
</tr>
</tbody>
</table>

Optimal medical Rx
Recommendations of ARBs in HFrEF

Unable to tolerate ACEI (ARB+MRA): Class I
  • Reduce risk of HF hospitalization and death

ACEI+ARB+MRA is NOT recommended: class III

Any role of ACEI + ARB in HFrEF?

Unable to tolerate MRA (ACEI+ARB): Class I(ESC), IIb(AHA)
  • Reduce risk of HF hospitalization
Hydrazine-Nitrates in patients with symptomatic (NYHA class II–IV) systolic heart failure

AHA guideline Class I: Add-on therapy to ACEI+BB in African Americans

The combination of a fixed dose of isosorbide dinitrate and hydralazine to a standard medical regimen for HF, including ACEIs and beta blockers, is recommended in order to improve outcomes for patients self-described as African Americans, with NYHA functional class III or IV HF.
Digoxin in patients with symptomatic (NYHA class II–IV) systolic heart failure

Digoxin can be used to control the ventricular rate in patients with permanent atrial fibrillation, usually in conjunction with a beta-blocker (Class I). Patients who are intolerant to beta-blockers may benefit from adding digoxin (Class Ia). The addition of digoxin to an optimized A:B:M regimen may reduce the risk of HF hospitalization (Class IIa B).
Heart Failure

- LVEF≤40%
  - HF with reduced EF (HFrEF)
- LVEF 41-49%
  - Borderline
- LVEF≥50%
  - HF with preserved EF (HFpEF)
HFrEF

Cardiac syndrome – Myocardial cell loss and fibrosis

Activation of Neurohormonal system

HEART ➔ Periphery

HFpEF

Systemic syndrome – accumulated risk factors and comorbidities (Age, female, HT, MS/DM, obesity, renal dysfunction)

Systemic inflammatory state ➔ Endothelial dysfunction ➔ Loss of compliance and adaptability of both heart and vessels

Periphery ➔ HEART
High-output Heart Failure

- Chronic anaemia
- Chronic hypercapnia
- Thyrotoxicosis
- Sepsis
- Beriberi heart disease
- Pregnancy
- Obesity
- Hepatic disease*
- Carcinoid syndrome*

- Systemic arterio-venous fistula
  - Paget’s disease
  - Multiple myeloma
  - Albright’s disease
  - Hepatic disease*
  - Carcinoid syndrome*

- Vasodilatation
- Arterio-venous shunting

- Reduced systemic vascular resistance
- Reduced arterial blood pressure
- Reduced renal perfusion

- Sympathetic activation
- Increased heart rate
- Increased vasoconstriction

- RAAS activation
- Salt and water retention
- Interstitial fibrosis

- Ventricular remodelling

- Clinical heart failure

* Hepatic disease and carcinoid syndrome may cause both vasodilatation and arterio-venous shunting
Topics

• CAD
  • Acute coronary syndrome
  • Stable CAD

• Congestive heart failure

• Arrhythmias/syncope/SCD

• Valvular heart disease/IE/Rheumatic fever

• Others: Pericardial disease, Aortic disease, Pregnancy-related, Preoperative Evaluation
Transient loss of consciousness

Syncope

1. Vasovagal
2. Situational
3. Carotid hypersensitivity

Orthostatic hypotension
1. Drug-induced
2. Volume depletion
3. Autonomic Failure

Cardiac syncope
1. Structural heart
2. Arrhythmias

Non-syncope
Seizure
(Drugs/Toxin)
Role of Tilt Testing (Class I)

• Unexplained syncope in patient whom cardiac causes of syncope have been excluded:
  – Recurrent episodes
  – Single episode in high risk settings (eg. physical injury or with occupational implications)
Recommendations

Tilt testing

• Indications:
  - Tilt testing is indicated in case of unexplained single syncopal episode in high-risk settings* or recurrent episodes in the absence of organic heart disease, after cardiac causes of syncope have been excluded.
  - Tilt testing is indicated when it is needed to demonstrate susceptibility to reflex syncope to the patient.
  - Tilt testing should be considered to discriminate between reflex and OH syncope.
  - Tilt testing may be considered for differentiating syncope with jerking movements from epilepsy.
  - Tilt testing may be indicated for evaluating patients with recurrent unexplained falls.
  - Tilt testing may be indicated for evaluating patients with frequent syncope and psychiatric disease.
  - Tilt testing is not recommended for assessment of treatment.
  - Isoproterenol tilt testing is contraindicated in patients with ischaemic heart disease.

*occurrence of, or potential risk for, physical injury or with occupational implications.

www.escardio.org/guidelines

European Heart Journal 2009;30:2631-2671
Clinical Features suggesting Cardiac Syncope

1. Syncope during supine
2. Syncope during exertion
3. Palpitation at the time of syncope
4. Underlying structural heart disease
5. Family history of sudden death
6. Absence of prodromal symptoms in relatively young patient

Post-exercise = reflex syncope
ระวังสับสนใจเต้นแรงใน reflex syncope
DCM / HCM / ARVD
Channelopathies (Brugada/SQTS/LQTS) with Syncope

Most likely mechanism: Ventricular Tachyarrhythmias

AICD Implantation (IIa indication)
Role of Electrophysiological Study

• EP study is indicated when cardiac arrhythmic syncope is suspected:
  1. Bundle branch block (EF>35%)
  2. Nondiagnostic sinus bradycardia
  3. History of sudden and brief episodes of palpitations preceding the syncopal event
  4. Previous MI (preserved LV systolic function)
Management of Brugada syndrome

- **Lifestyle changes (Class I)**
  - Avoid drug-induced brugada (Na+ channel blocker)
  - Avoid excessive alcohol drinking
  - Avoid large meal
  - Prompt treatment of any fever with antipyretic drugs
  - (Avoid hypokalemia)

- **ICD implantation**
  - VT/VF survivors (Class I)
  - Syncope (Class IIa)
  - EP study induces VT/VF (Class IIb)

- **Medications (Class IIa)**
  - Quinidine in patients who qualify for an ICD but have contraindication or refuse it
  - Quinidine or isoproterenol in VF storm
Novel Oral Anticoagulants (NOACs)

Direct Factor Xa Inhibitors
- Rivaroxaban
- Apixaban
- Edoxaban

Direct Thrombin Inhibitors
- Dabigatran etexilate
- Ximelagatran
- AZD 0837
New Anticoagulant Therapies Compared to Warfarin: Stroke or Systemic Embolism

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New Anticoagulant Therapies Compared to Warfarin: Major Bleeding

Dabigatran 150 mg BID\(^1\)

HR 0.93 (95% CI, 0.81 to 1.07)

Dabigatran 110 mg BID\(^1\)

HR 0.80 (95% CI, 0.70 to 0.93)

Rivaroxaban 20 mg QD\(^2\)

HR 1.04 (95% CI, 0.90 to 1.20)

Apixaban 5 mg BID\(^3\)

HR 0.69 (95% CI, 0.60 to 0.80)

Edoxaban 60 mg QD\(^4\)

HR 0.80 (95% CI, 0.71 to 0.91)

Edoxaban 30 mg QD\(^4\)

HR 0.47 (95% CI, 0.41 to 0.55)

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New Anticoagulant Therapies Compared to Warfarin: Intracranial Hemorrhage

![Chart showing hazard ratios for different anticoagulant therapies compared to warfarin.]

- **Dabigatran 150 mg BID**: HR 0.41 (95% CI, 0.28 to 0.60)
- **Dabigatran 110 mg BID**: HR 0.30 (95% CI, 0.19 to 0.45)
- **Rivaroxaban 20 mg QD**: HR 0.67 (95% CI, 0.47 to 0.93)
- **Apixaban 5 mg BID**: HR 0.42 (95% CI, 0.30 to 0.58)
- **Edoxaban 60 mg QD**: HR 0.47 (95% CI, 0.34 to 0.63)
- **Edoxaban 30 mg QD**: HR 0.30 (95% CI, 0.21 to 0.43)

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AF for Cardioversion

- **<48 hrs**
  - **Low-risk**
    - Cardioversion
    - No OAC
  - **High-risk**
    - Cardioversion
    - Heparin/NOAC
    - Long-term OAC (4 wks in 2° AF)

- **≥48 hrs**
  - **OAC≥3wks**
    - Cardioversion
    - Low-risk
    - OAC 4 wks
  - **TEE (no clot)**
    - High-risk
    - Long-term OAC

**High-risk stroke: CHA2DS2-VASc >2**

AHA Guideline 2014
Approach to Selecting Drug Therapy for Ventricular Rate Control

Atrial Fibrillation

- No Other CV Disease
  - Beta blocker
  - Diltiazem
  - Verapamil

- Hypertension or HFpEF
  - Beta blocker
  - Diltiazem
  - Verapamil

- LV Dysfunction or HF
  - Beta blocker†
  - Digoxin‡

- COPD
  - Beta blocker
  - Diltiazem
  - Verapamil

Amiodarone§

Digoxin should be avoided in ‘Paroxysmal AF’
Negative Trials in Dronedarone

ANDROMEDA study
Dronedarone Increased Mortality in Heart Failure

PALLAS study
Dronedarone Increased Mortality in Permanent AF
THANK YOU