Management of arrhythmia in IHD

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The Conducting system . . .

The Conducting System
IHD patient may have arrhythmia in one of the following situations:

- Cardiac arrest.
- Acute coronary syndrome.
- Chronic stable angina.
- Following CABG.
Arrhythmias associated with cardiac arrest

- Resuscitation and defibrillation should be administered in accordance with the Resuscitation guidelines. (ABCD)
  - Defibrillation in patients with VF or pulseless VT should be administered without delay for witnessed cardiac arrests and immediately following two minutes of CPR for unwitnessed out-of-hospital cardiac arrests.

Arrhythmias associated with acute coronary syndrome (STEMI and NSTEMI)

- Brady-arrhythmias
- Tachy-arrhythmias
Arrhythmias and conduction disturbances are common.

Early reperfusion therapy reduces the risk of ventricular arrhythmias and cardiovascular death.

The evidence for benefits of antiarrhythmic drugs in STEMI patients is limited and negative effects of antiarrhythmic drugs on early mortality have been demonstrated.

Careful use of antiarrhythmic drugs is generally recommended and alternative treatment options such as electrical cardioversion, a ‘wait and see’ strategy for arrhythmias with no or moderate haemodynamic relevance, or in selected cases cardiac pacing and catheter ablation, should be considered.

Correction of electrolyte imbalances and early treatment with beta-blockers, ACE inhibitors/ARBs, and statins is recommended.
Sinus Bradycardia

Sinus bradycardia is common in the first hours of STEMI, especially in inferior MI. In some cases, opioids are responsible. It often requires no treatment. If accompanied by severe hypotension → i.v. atropine.

Other types of heart block

- **1st degree heart block**
  Prolonged but fixed
  P-R interval
First A–V Block with very prolonged PR interval

Other types of heart block

- 2\textsuperscript{nd} degree heart block
- type I
  Gradual prolongation of P-R interval followed by drop of 1 QRS complex
Atropine should be used first; if it fails, pacing should be instituted. Agents that slow AV conduction (such as beta-blockers, digitalis, verapamil, or amiodarone) should be used with caution.

**Other types of heart block**

- 2nd degree heart block
- type II
  - Sudden drop of QRS complex
SECOND DEGREE A-V BLOCK
MOBITZ TYPE II

COMPLETE A-V BLOCK
OR
THIRD DEGREE A-V BLOCK

Pacing ➔ Revascularization.
AV block associated with inferior wall infarction is usually supra-Hisian and usually resolves spontaneously or after reperfusion.

AV block associated with anterior wall MI is usually infra-Hisian and has a high mortality rate due to the extensive myocardial necrosis.

The development of a new bundle branch block or hemiblock usually indicates extensive anterior MI.
Only 9% of these patients requiring permanent pacing.

Patients with AV block have a higher in-hospital and 30-day mortality than those with preserved AV conduction, irrespective of the site of the infarction.

However, 30 days after the infarction, the mortality rates of patients with and without AV block are equal, indicating that both patient groups have the same long-term prognosis.

**Tachy arrhythmias**

- **Sinus tachycardia**
  1- rapid heart rate > 100
  2- normal P-R interval
Atrial fibrillation

Up to 21% of patients with STEMI. AF may be pre-existing, first-time detected, or of new onset.

In many cases, the arrhythmia is well tolerated and no specific treatment is required, other than anticoagulation. Prompt treatment is required in acute haemodynamic instability.

Electrical cardioversion should be considered but early recurrence of AF is frequent after successful cardioversion.
- Acute rhythm control is limited to the use of amiodarone.
- Adequate rate control $\rightarrow$ beta-blockers.
- In patients with extensive myocardial damage or severe LV dysfunction, rate control is more safely achieved with i.v. digoxin with or without concomitant administration of i.v. amiodarone.
- Several studies have suggested that new-onset AF may be reduced by beta-blockers, ACE inhibitors/ARBs, and also early-onset statin therapy.

Ventricular Ectopic Beats
Ventricular arrhythmias (continued)

Unifocal PVC's: identical shapes
Note: A single PVC is labeled isolated

Multifocal PVC's: more than one shape
Ventricular arrhythmias (continued)
- Ventricular premature beats are very frequent on the first day of the acute phase and complex arrhythmias (multiform complexes, short runs, or the R-on-T phenomenon) are common.

- Their value as predictors of VF is questionable and no specific therapy is required.
V Tac. . .

Non-sustained V Tac.
Polymorph's V Tac. (Torsade de pointes)

Ventricular arrhythmias (continued)

Ventricular tachycardia (VT)
Ventricular arrhythmias (continued)

- 6–8% of patients still develop haemodynamically significant VT or VF during the acute phase phase.
- The typical arrhythmia presentation is unstable, frequently polymorphic, and relatively fast VT, often degenerating into VF. Urgent reperfusion is most important as ischaemia often triggers these arrhythmias.
- Beta-blockers are recommended if no contraindications exist.
- Repetitive electrical cardioversion or defibrillation may be necessary.
- If there is no sufficient control, i.v. administration of amiodarone is recommended.
- In case of contraindications to amiodarone, i.v. lidocaine may be considered, although no studies comparing superiority of either drug in STEMI patients are available.

- VT or VF may occur at the time of restoration of coronary blood flow (reperfusion arrhythmias). No specific antiarrhythmic drug therapy is necessary due to the benign long-term course.
Arrhythmias associated with chronic CHD / decreased LVEF

**ATRIAL FIBRILLATION**

- Choice of antiarrhythmic drug
- Rate vs rhythm control
- Non-pharmacological therapies

Antithrombotic therapy in atrial fibrillation:

Arrhythmias associated with chronic CHD/decreased LVEF

**AF-Rate control**

- Rate VERSUS rhythm control is the recommended strategy for management of patients with well tolerated atrial fibrillation. (A)

- Ventricular rate in AF should be controlled with beta blockers, rate-limiting calcium channel blockers (*verapamil* or *diltiazem*), or digoxin. (A)
Arrhythmias associated with chronic CHD/decreased LVEF

AF-Rhythm control

• Amiodarone or sotalol treatment should be considered where prevention of atrial fibrillation recurrence is required on symptomatic grounds. (A)

• Patients with atrial fibrillation who are severely symptomatic despite optimum tolerated medical therapy should be offered non-pharmacological therapy, e.g. radiofrequency ablation.

Arrhythmias associated with chronic CHD/decreased LVEF

VENTRICULAR ARRHYTHMIAS

- Implantable Cardioverter Defibrillators in primary & secondary prevention

- Antiarrhythmic drug therapy
Arrhythmias associated with chronic CHD/decreased LVEF

ICDs in primary prevention

• Patients with moderate to severe LV dysfunction (e.g. ejection fraction <0.35), in NYHA Class I-III at least one month after myocardial infarction should be considered for ICD therapy. (A)

• Patients with spontaneous non-sustained ventricular tachycardia (especially if sustained ventricular tachycardia is inducible), severely impaired ejection fraction (<0.25) or prolonged QRS complex duration (>120 ms) should be prioritised for ICD implantation. (B)

• Patients meeting criteria for ICD implantation who have prolonged QRS duration (>120 ms) and NYHA class III-IV symptoms should be considered for CRT-D therapy. (A)

Arrhythmias associated with chronic CHD/decreased LVEF

ICDs in secondary prevention

• Revascularisation should be considered in patients who have had sustained VT or VF. (C)

• Patients surviving the following ventricular arrhythmias in the absence of acute ischaemia or treatable cause should be considered for ICD implantation:
  • cardiac arrest (VT or VF)
  • VT with syncope or haemodynamic compromise
  • VT without syncope if LVEF < 0.35 (not NYHA IV). (A)
Arrhythmias associated with chronic CHD/decreased LVEF

Antiarrhythmic drug therapy

• Class 1 anti-arrhythmic drugs should not be used for treatment of premature ventricular beats or non-sustained VT in patients with previous MI. (A)

• Long term beta blockers are recommended for routine use in post-MI patients without contraindications. (A)

Arrhythmias associated with CABG surgery

ATRIAL FIBRILLATION
Conclusions

- Management of cardiac arrhythmias in patients with CHD is mainly the same as that of those without CHD.

- In acute coronary syndrome → resuscitate → revascularize → wait and see.

- Standard post-MI treatments reduce incidence of sudden cardiac death e.g. thrombolyis, beta-blockade, ACE inhibitors, statins.

- Non-pharmacological therapies may further prevent sudden death e.g. ICD.

Thank You