بنام خداوند:

که در همین نزدیکی

و سر هر گوجه‌ای

هر چه
Pregnancy and arrhythmia

FARMANIEH HOSPITAL

A.R.AKHAVEIN CARDIOLOGIST

2TH. MEHR- 1400
(g) T wave: Ventricles repolarize and relax

- **Depolarization**
  - Yellow
- **Repolarization**
  - Green
TWO QUESTIONS:

1- What is the definition of cardiac rhythm?

   (the origin of impulse formation: sinus, atrium, A.V.N., ventricle)

2- What is the definition of cardiac arrhythmia?

   (Any disturbances in impulse formation, or conduction, or both)
Arrhythmia classification: based on heart rate

1- Brady Arrhythmia < 60 P.M.

2- Tachyarrhythmia > 100 P.M.
Arrhythmia classification: based on location:

1- supraventricular:
   a- sinus tachycardia
   b- PAC complexes
   c- paroxysmal atrial tachycardia (P.A.T.)
   d- atrial fibrillation / flutter
   e- A.V.N. reentrant tachycardia (A.V.N.R.T.)
   f- preexcitation syndrome (W.P.W.)

2- ventricular:
   a- P.V.C. complexes
   b- ventricular: tachycardia / fibrillation / flutter
CHANELLOPATHIES:

1- long /short QT- interval syndrome

2- brugada syndrome

3- R.V. arrhythmogenic cardiomyopathy

4- catecholaminergic polymorphic V.T.

5- familial : D.C.M. , S.S.S. , A.F.
Incidence:

1- on holter recording: up to 60% in normal pregnancies

2- PAC: 57%

3- PVC: >50%

4- sustained Ventricular tachycardia: 2-3 cases /1000 pregnancies
Causes:

1- arrhythmogenesis markers during normal pregnancies

2- underlying cardiovascular diseases:
   (C.M. , I.H.D. , V.H.D. , C.H.D., channelopathies)

3- medical problems: thyroid diseases, electrolytes disturbances, anemia, ....

4- heart damage from a previous pregnancy

5- anxiety or stress

6- food or drinks: caffeine

7- drugs: pseudoephedrine
Arrhythmogenesis markers

1- increase in blood volume and preload

2- increased heart rate

3- fluid retention and electrolytes shift: total Na/K, total Ca, Mg

4- hormonal and autonomic changes

5- increase in the level of catecholamines

6- increase renin angiotensin aldosterone axis components
Individualized evaluation

Three key features:

1- History:
   a: asymptomatic
   b: cardiac symptoms (palpitation, C.P., dyspnea, ...)
   c: presyncope, syncope, loss of consciousness
   d: sudden cardiac death

2- Physical exam.: depending whether cardiovascular disease is present?

3- E.C.G.
Laboratory testing

1. Resting E.C.G. (especially during any symptom)
2. E.C.G. Holter monitoring and event recording
3. Exercise stress test
4. Echocardiography stress test
5. Head-up tilt-table testing (in patients with syncope)
6. Pharmacological testing
7. Electrophysiological study (E.P.S.)
1-In the absence of cardiopulmonary disease: often (but not always): **IS GOOD**

2- usually disappear after pregnancy
treatment
Treatment ........

Depend on:

- frequency
- duration
- hemodynamic situation?

So:

MAY ONLY REQUIRE REASSURANCE
two general principles:

1- bradyarrhythmia with hemodynamic changes = pacemaker

2- tachyarrhythmia with hemodynamic changes = Electrical cardioversion
1- antiarrhythmic drugs:

a- greatest risk: during first trimester (organoneogenesis)

b- initially: with smallest dose

c- increase the dose, if used to before pregnancy

d- majority of drugs, have class C, FDA classification

e- atenolol should not be used for any arrhythmia (I.U.R.G)
Effects of cardiovascular drugs on fetus during pregnancy
Safe drugs:

1- adenosine

2- digoxin

3- sotalol (often used to treat fetal arrhythmia)
Relatively safe:

1- beta blockers:
   (I.U.R.G., neonatal bradycardia / hypoglycemia)
   labetalol used to treat HTN

2- Calcium channel blockers:
   decrease uterine tone at time of delivery
   nifedipine used to treat HT
   verapamil used to treat A.V.N.R.T.

3- flecainide:
   (often used to treat fetal arrhythmia)

4- procainamide:
   (often used to treat fetal arrhythmia)
Contraindicated:

Amiodarone:

A-goiter, hypothyroidism, hyperthyroidism
B-bradycardia
C- I.U.R.G.
Table 15 Recommendations for the management of arrhythmias

### Management of supraventricular tachycardia (SVT)

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>For acute conversion of paroxysmal SVT, vagal manoeuvre followed by i.v. adenosine is recommended.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Immediate electrical cardioversion is recommended for acute treatment of any tachycardia with haemodynamic instability.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>For long-term management of SVT oral digoxin or metoprolol/propranolol, is recommended.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>For acute conversion of paroxysmal SVT, i.v. metoprolol or propranolol should be considered.</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>For long-term management of SVT, oral sotalol or flecainide should be considered if digoxin or a β-blocking agent fails.</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>For acute conversion of paroxysmal SVT, i.v. verapamil may be considered.</td>
<td>IIb</td>
<td>C</td>
</tr>
<tr>
<td>For long-term management of SVT, oral propafenone, or procainamide may be considered as a last option if other suggested agents fail and before amiodarone is used.</td>
<td>IIb</td>
<td>C</td>
</tr>
<tr>
<td>For long-term management of SVT, oral verapamil may be considered for rate regulation if the other AV nodal-blocking agents fail.</td>
<td>IIb</td>
<td>C</td>
</tr>
<tr>
<td>Atenolol should not be used for any arrhythmia.</td>
<td>III</td>
<td>C</td>
</tr>
</tbody>
</table>

### Management of ventricular tachycardia (VT)

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<tr>
<td>The implantation of an ICD, if clinically indicated, is recommended prior to pregnancy but is also recommended whenever indicated, during pregnancy.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>For long-term management of the congenital long QT syndrome, β-blocking agents are recommended during pregnancy and also postpartum when they have a major benefit.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>For long-term management of idiopathic sustained VT oral metoprolol, propranolol or verapamil is recommended.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Immediate electrical cardioversion of VT is recommended for sustained, unstable, and stable VT.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>For acute conversion of VT that is sustained, haemodynamically stable, and monomorphic, i.v. sotalol or procainamide should be considered.</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>Implantation of permanent pacemakers or ICDs (preferably one chamber) should be considered with echocardiographical guidance, especially if the fetus is beyond 8 weeks gestation.</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>For acute conversion of VT that is sustained, monomorphic, haemodynamically unstable, refractory to electrical cardioversion or not responding to other drugs, i.v. amiodarone should be considered.</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>For long-term management of idiopathic sustained VT oral sotalol, flecainide, propafenone should be considered if other drugs fail.</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>Catheter ablation may be considered in the case of drug-refractory and poorly tolerated tachycardias.</td>
<td>IIb</td>
<td>C</td>
</tr>
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</table>
Specific arrhythmia treatment
Bradyarrhythmia:

1- physiologic sinus bradycardia may appear in 2th trimester

2- pathologic bradycardia is rare (congenital C.H.B.)

3- may needs P.M. during labor

4- avoided spinal anesthesia
bradyarrhythmia
Sinus arrest

- Transient cessation of impulse formation at the sinoatrial node.
- A prolonged pause without P activity.
- The pause is unrelated to the length of the P-P cycle.

Sinus arrest with pause of 4.4 s before generation and conduction of a junctional escape beat.
Idioventricular rhythm
Third Degree Heart Block (3°) (Complete)
Tachyarrhythmia treatment: depending on type of arrhythmia and underlying causes
# Sinus Rhythms

## Sinus Tachycardia

![ECG Diagram]

<table>
<thead>
<tr>
<th>Heart Rate</th>
<th>Rhythm</th>
<th>P Wave</th>
<th>PR Interval (sec.)</th>
<th>QRS (Sec.)</th>
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<tr>
<td>&gt;100</td>
<td>Regular</td>
<td>Before each QRS, identical</td>
<td>.12 - .20</td>
<td>&lt;.12</td>
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PREMATURE ATRIAL CONTRACTION
# Sinus Rhythms

## Sinus Tachycardia

![EKG Image](image)

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</table>
# Atrial Rhythms

## Atrial Flutter

![ECG Image]

<table>
<thead>
<tr>
<th>Heart Rate</th>
<th>Rhythm</th>
<th>P Wave</th>
<th>PR Interval (sec.)</th>
<th>QRS (Sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrial=250-400</td>
<td>Irregular</td>
<td>Sawtooth</td>
<td>Not Measurable</td>
<td>&lt;.12</td>
</tr>
<tr>
<td>Ventricular Var.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Atrial fibrillation and flutter treatment

1- uncommon

2- mostly there is C.V.D. (M.S. ....) or other causes of arrhythmia

3- acute phase: amiodarone or mexiletine

4- control H.R.: sotalol, betablockers, digoxin, verapamil

5- anticoagulant (LMWH, UFH, warfarin). DOAC?
A.V.N.R.T.

(atrioventricular node reentrant tachycardia)
1- common, and may beget first time in pregnancy (24th.W.)

2- more repeated in pregnancy

3- in normal and diseased heart

3- treatment:

a- vagotonic manoeures

b- the same as non pregnant

c- first line: adenosine

d- second line: verapamil
## Ventricular Rhythms

### Ventricular Tachycardia

<table>
<thead>
<tr>
<th>Heart Rate</th>
<th>Rhythm</th>
<th>P Wave</th>
<th>PR Interval (sec.)</th>
<th>QRS (Sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 – 250</td>
<td>Regular</td>
<td>No P waves corresponding to QRS, a few may be seen</td>
<td>NA</td>
<td>&gt;.12</td>
</tr>
</tbody>
</table>
Idiopathic ventricular tachycardia

1- very rare, most common V.T. in pregnancy

2- variant PVC, short V.T.

3- usually stable

3- treatment: beta blockers, verapamil
THANK YOU
HELP THOSE IN SUFFERING