ESC Guidelines on the Management of Cardiovascular Diseases during Pregnancy

Task force on the management of CVD during pregnancy of the ESC

Chair:

Vera Regitz-Zagrosek, Charite, Berlin
DECLARATION OF CONFLICT OF INTEREST

• None
The Task Force on the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC)

Endorsed by the European Society of Gynecology (ESG), the Association for European Paediatric Cardiology (AEPC), and the German Society for Gender Medicine (DGesGM)

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Aim of this presentation

• Overview on the structure and content of document

• Novelty, strength of the guideline

• Examples for essential messages

• Not: comprehensive discussion of guidelines!
  – See session: guidelines for the management of CVD during pregnancy, 30.8.11 – Oslo, Zone B, 8.30 – 10.00 h.
Strength of the guideline

• First ESC /AHA guideline focussed on CVD in pregnancy with graded recommendations
• First detailed and extensive coverage of the field in a European guideline (German Cardiac society guideline in 2008; ESC Expert consensus document in 2003)
• European agreement on controversial issues
• Integration of novel aspects
• Multidisciplinary approach; combining adult and pediatric cardiology, cardiovascular surgery, gynecology, pharmacology,
Relevance

O.2-4 % of all pregnancies in industrialized nations are complicated by CVD.

In western countries, maternal CVD is the main cause of maternal death during pregnancy.

Number of pregnant women with CVD is increasing, due to older pregnancy age and successful surgery of congenital HD.
Epidemiology

- **Hypertension,**
  6-8 % of pregnancies, serious complications infrequent

- **Congenital HD**
  most frequent cause of cardiac complications in the western world (75-82 %), only 9-19 % outside Europe and NA

- **Valvular HD**
  15 % in industrialized countries, dominant in developing countries (56-89 %), among those rheumatic diseases: 90 %; Mitral stenosis most frequent

- **Coronary HD**
  rare, but increasing

- **Myocardial Disease, CMP:**
  rare, but severe. strong variation according to country
<table>
<thead>
<tr>
<th>Physiological changes</th>
<th>Haemodynamic, metabolic, haemostatic mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic testing:</td>
<td>Yes, if CMP and channelopathies; other family members affected; dysmorphic features or other congenital abnormalities present.</td>
</tr>
<tr>
<td>Diagnosis in the mother:</td>
<td>Lab, Echo; Exercise testing, MRI (without gado; IIa C); radiation doses for X-ray, CT, CA, PCI</td>
</tr>
<tr>
<td>Fetal assessment:</td>
<td>Echo, Biophysical profile, and more</td>
</tr>
<tr>
<td>Interventions in the mother</td>
<td>PCI and cardiac surgery: best time: 13th to 28th week</td>
</tr>
<tr>
<td>Delivery</td>
<td>...............</td>
</tr>
<tr>
<td>Infective endocarditis</td>
<td>As in non-pregnant women (no routine AB at delivery)</td>
</tr>
<tr>
<td>Risk estimation</td>
<td>...............</td>
</tr>
<tr>
<td>Contraception and termination</td>
<td>Depending on risk: Low dose oral hormonal/ levonorgestrel releasing intrauterine devices</td>
</tr>
</tbody>
</table>
General recommendations: Timing and mode of delivery

Vaginal delivery is first choice for most patients (I)
• Less blood loss, less infections, lower thrombembolic risk

Indications for caesarian delivery (IIa)
• Obstetric indications
• Preterm labour in patients on OAC
• Marfan and Aortic dilatation (> 45 mm: II a; 40-45 mm: II b))
• Acute or chronic aortic dissection
• Severe Heart failure
• Severe AS/LVOTO
• Eisenmenger syndrome
General recommendations:
Risk estimation

**Table 4** Predictors of maternal cardiovascular events and risk score from the CARPREG study\(^{12}\)

- Prior cardiac event (heart failure, transient ischaemic attack, stroke before pregnancy or arrhythmia).
- Baseline NYHA functional class >II or cyanosis.
- Left heart obstruction (mitral valve area <2 cm\(^2\), aortic valve area <1.5 cm\(^2\), peak LV outflow tract gradient >30 mmHg by echocardiography).
- Reduced systemic ventricular systolic function (ejection fraction <40%).

CARPREG risk score: for each CARPREG predictor that is present a point is assigned. Risk estimation of cardiovascular maternal complications
0 point  5%
1 point  27%
>1 point 75%

*Source: European Society of Cardiology*
General recommendations:
High risk states; contraindications for pregnancy

<table>
<thead>
<tr>
<th>Conditions in which pregnancy risk is WHO IV (pregnancy contraindicated)</th>
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</thead>
<tbody>
<tr>
<td>• Pulmonary arterial hypertension of any cause</td>
</tr>
<tr>
<td>• Severe systemic ventricular dysfunction (LVEF &lt;30%, NYHA III–IV)</td>
</tr>
<tr>
<td>• Previous peripartum cardiomyopathy with any residual impairment of left ventricular function</td>
</tr>
<tr>
<td>• Severe mitral stenosis, severe symptomatic aortic stenosis</td>
</tr>
<tr>
<td>• Marfan syndrome with aorta dilated &gt;45 mm</td>
</tr>
<tr>
<td>• Aortic dilatation &gt;50 mm in aortic disease associated with bicuspid aortic valve</td>
</tr>
<tr>
<td>• Native severe coarctation</td>
</tr>
</tbody>
</table>
General recommendations: Essential messages

• Start counselling and management by interdisciplinary teams before pregnancy.
• Refer high risk patients, according the WHO scores, to specialised centres.
• Maternal diagnosis: avoid radiation and prefer echocardiography, exercise testing and MRI
• Fetal diagnosis: Searching for congenital malformations in affected families by echocardiography may start in week 13
• Surgical interventions in the mother are possible.
• Mode of delivery should be decided by experienced teams; individualised strategy and vaginal is preferred
### Congenital Heart Diseases: Maternal high risk conditions WHO (III)-IV

<table>
<thead>
<tr>
<th>Condition</th>
<th>Expected outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary hypertension</td>
<td>Neonatal survival 87-89 % (Bedard, EHJ 2009)</td>
</tr>
<tr>
<td>Eisenmenger syndrome</td>
<td>Maternal mortality of 20-50 %. Life birth 12 % if O2 saturation &lt;85 % (Presbitero, Circ 1994)</td>
</tr>
<tr>
<td>Cyanotic HD without PH</td>
<td>Depends on maternal oxygen saturation. Life birth 12 % if O2 saturation &lt;85 % (Presbitero, Circ 1994)</td>
</tr>
<tr>
<td>Severe LVOTO</td>
<td>Should be treated before pregnancy. If not, discourage pregnancy</td>
</tr>
</tbody>
</table>
# Congenital Heart Diseases: Specific defects

<table>
<thead>
<tr>
<th>Specific defect</th>
<th>Maternal and fetal risk, management and delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD, VSD, AVSD, CoA, PST, AVST</td>
<td>Low to moderate risk, WHO I or II</td>
</tr>
<tr>
<td>Repaired Fallot, Ebstein’s anomaly</td>
<td>WHO II</td>
</tr>
<tr>
<td>Transposition of great arteries</td>
<td>WHO III, Irreversible decline in maternal cardiac function in 10% of pregnancies</td>
</tr>
<tr>
<td>Congenitally corrected TGA</td>
<td>WHO III, Fetal loss increased, Pregnancy contraindicated if EF &lt; 40%</td>
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<td></td>
<td>.................</td>
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</tbody>
</table>
Congenital Heart Diseases (CHD): Essential messages

- Women with CHD may tolerate pregnancy well. The risk depends on the underlying specific constellation.
- All patients with CHD should be seen by the end of the first trimester and an individualized follow up plan should be established.
- Vaginal delivery can be planned in most patients.
- Discuss high risk conditions, contraindications and indications for caesarean delivery on an individual basis.
Aortic Disease:

The diagnosis of aortic dissection should be considered in all patients with chest pain during pregnancy as this diagnosis is often missed. Dissection occurs most often in the last trimester of pregnancy (50%) or the early postpartum period (33%).

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marfan-Syndrome</td>
<td>Discourage pregnancy women if aortic root diameters &gt;45 mm</td>
</tr>
<tr>
<td>Bicuspid AV</td>
<td>Dissection less likely than in marfan, but risk present</td>
</tr>
<tr>
<td>Ehlers Danlos (IV)</td>
<td>Autosomal dominant, risk of uterine rupture. Aortic rupture may occur without dilatation.</td>
</tr>
<tr>
<td>Turner-Syndrome</td>
<td>Aortic rupture may occur without dilatation. Increased risk of pre-eclampsia</td>
</tr>
</tbody>
</table>
Valvular heart disease

- Moderate and severe mitral stenosis and symptomatic aortic stenosis are poorly tolerated during pregnancy and should be treated interventionally pre-pregnancy.
- During pregnancy mitral percutaneous commissurotomy should only be considered when symptoms persist despite medical therapy.
- Regurgitant lesions are better tolerated than stenotic lesions.
- Prepregnancy intervention is only indicated when severe regurgitation is accompanied by refractory heart failure or severe ventricular dilatation or dysfunction.
Valvular heart disease  
Mechanical valve prosthesis

- Oral anticoagulation (OAC) with vitamin K antagonists are the safest therapy to prevent valve thrombosis and are recommended during the second and third trimester (I)
- During the first trimester continuation of OAC should be considered when the required daily dose is low (warfarin < 5 mg) (II a)
- When the required daily warfarin dose is > 5 mg UFH or LMWH with strict dose-adjustment according to APTT or anti-factor Xa levels (weekly control) should be considered (II a)
- At the 36th week of gestation OAC should be discontinued and replaced by dose-adjusted UFH or LMWH (I)
- When delivery starts while still on OAC, caesarean delivery is indicated to prevent fetal cerebral bleeding (I)
Coronary Artery Disease

- ACS in pregnancy is rare, complicates 3-6 of 100,000 deliveries
- ECG and Troponin T levels should be obtained in all women with chest pain (I)
- Spontaneous dissection of coronary arteries is more frequent in pregnant than in non-pregnant women
- Coronary angioplasty is the preferred reperfusion strategy for STEMI (I)
- Pregnancy may be considered in women with known CAD, if there is no residual ischemia and EF > 40%.
Cardiomyopathies are, but cause severe complications of pregnancy. Peripartum, dilated and hypertrophic cardiomyopathy can occur in pregnancy.

Peripartum cardiomyopathy (PPCM):

- HF can develop rapidly, use guidelines for acute and chronic HF, consider contraindications for some drugs (I)
- Spontaneous recovery can occur (up to 50 %)
- Avoid ACEI, ARB and renin inhibitors, if possible. Prefer hydralazine and nitrates, Dopamine, levosimenden, digitalis; β1 selective blockers; use diuretics with caution.
- Use anticoagulation with LMWH or OAC according to pregnancy state in pts with intracardiac thrombi, embolisms, atrial fibrillation (I)
- Deterioration in LV function occurs in up to 50% and carries a poor prognosis.
Other cardiomyopathies

Dilated cardiomyopathy (DCM):
- Treatment as in PPCM
- Women with DCM should be informed about the risk of deterioration during gestation and peripartum.
- LVEF <40% is a predictor of high risk. If LVEF is <20%, maternal mortality is very high and termination of the pregnancy should be considered.

HCM
- Pregnancy is usually tolerated well
- Use β1 blockers, treat AF, use LMWH or OAC if AF occurs
- Severity of LVOTO determines risk during pregnancy and delivery
Arrhythmia

- Arrhythmias requiring treatment develop in up to 15% of the patients with structural and congenital heart disease.
- In haemodynamically unstable patients with tachycardias direct cardioversion should be considered.
- Atrial flutter and atrial fibrillation are rare, prefer cardioversion after anticoagulation
- Life-threatening ventricular arrhythmias during pregnancy are rare.
Hypertension

- Benefits of antihypertensive therapy for mild-to-moderate hypertension (<160/110 mmHg) have not been demonstrated in clinical trials,
- Drug treatment of severe hypertension in pregnancy is beneficial.
  - Alpha-methyldopa is the drug of choice for long-term management
- ACE inhibitors, angiotensin II antagonists and direct renin inhibitors are strictly contraindicated.
Venous thromboembolism during pregnancy and the puerperium

• Venous thromboembolism (VTE) represents a significant cause of pregnancy related morbidity and mortality.

• All women should undergo assessment of risk factors before or in early pregnancy.
Drug therapy in pregnancy

• No uniform recommendations!
• In case of emergency, drugs that are not recommended during pregnancy and breast feeding should not be withheld to the mother. The potential risk and benefit must be weighed against each other.
• Different sources of evidence such as U.S. Food and Drug Administration (FDA) classification, Internet databases, Pharmaceutical industry recommendations have different strength and weaknesses.
• Overview table with major CV drugs/families, FDA category, placenta permeability, transfer to breast milk, adverse effects
Summary

First European interdisciplinary guideline on CVD in pregnancy

Most recommendations are C

Major gaps in evidence have been defined

More: Tuesday, Room Oslo, 8.30 h