

**Version  
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# ESSENTIAL MESSAGES FROM ESC GUIDELINES

Committee for Practice Guidelines

To improve the quality of clinical practice and patient care in Europe

## CVD DURING PREGNANCY

**GUIDELINES FOR THE MANAGEMENT  
OF CARDIOVASCULAR DISEASES  
DURING PREGNANCY**

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# ESC ESSENTIAL MESSAGES

## ESC GUIDELINES FOR THE MANAGEMENT OF CARDIOVASCULAR DISEASES DURING PREGNANCY (VERSION 2011)\*

The Task Force for 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)

### **Chairperson:**

#### **Vera Regitz-Zagrosek**

Charité Universitätsmedizin Berlin  
Institute for Gender in Medicine (GiM),  
Hessische Str 3-4 -10115 Berlin - Germany

Tel: +49 30 450 525 288

Fax: +49 30 450 7 525 288

**Email:** vera.regitz-zagrosek@charite.de

### **Task Force Members**

Carina Blomstrom Lundqvist, *Uppsala, Sweden*; Claudio Borghi, *Bologna, Italy*; Renata Cifkova, *Praha, Czech Republic*; Rafael Ferreira, *Alfragide, Portugal*; Jean-Michel Foidart, *Liège, Belgium*; J. Simon R. Gibbs, *London, UK*; Christa Gohlke-Baerwolf, *Bad Krozingen, Germany*; Bulent Gorenek, *Eskisehir, Turkey*; Bernard Jung, *Paris, France*; Mike Kirby, *Herts, UK*; Angela H.E.M. Maas, *Zwolle, The Netherlands*; Joao Morais, *Leiria, Portugal*; Petros Nihoyannopoulos, *London, UK*; Petronella G. Pieper, *Groningen, The Netherlands*; Patrizia Presbitero, *Rozzano, Italy*; Jolien W. Roos-Hesselink, *Rotterdam, The Netherlands*; Maria Schaufelberger, *Göteborg, Sweden*; Ute Seeland, *Berlin, Germany*; Lucia Torracca, *Torrette Ancona, Italy*

### **Other ESC entities having participated in the development of this document:**

*Associations: European Association of Percutaneous Cardiovascular Interventions (EAPCI), European Heart Rhythm Association (EHRA), Heart Failure Association (HFA).*

*Working Groups: Thrombosis, Grown-up Congenital Heart Disease, Hypertension and the Heart, Pulmonary Circulation and Right Ventricular Function, Valvular Heart Disease, Cardiovascular Pharmacology and Drug Therapy, Acute Cardiac Care, Cardiovascular Surgery.*

*Councils: Cardiology Practice, Cardiovascular Primary Care, Cardiovascular Imaging.*

### **ESC Staff:**



Cyril Moulin, Veronica Dean, Catherine Despres, Nathalie Cameron - Sophia Antipolis, France.

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# ESC GUIDELINES FOR THE MANAGEMENT OF CARDIOVASCULAR DISEASES DURING PREGNANCY (VERSION 2011)\*

## Table of contents

-  Section 1 - Take home messages
-  Section 2 - Major gaps in evidence

# Take home messages

## 1. General aspects

- Counseling of women with known or suspected CVD should start before pregnancy and include genetic aspects. Women with high risk - according the WHO scores - should be managed in specialized centres, by interdisciplinary teams.
- Foetal congenital malformations in affected families should be searched by echocardiography starting week 13.
- For CVD diagnosis in the mother, prefer echocardiography, exercise testing and magnetic resonance imaging (without contrast material); avoid radiation.
- Cardiac catheter and surgical interventions in the mother should be avoided, but are possible.
- Mode of delivery should be individualized. Vaginal delivery is preferred in most patients.

## 2. Congenital Heart Disease

- Most women with congenital heart disease tolerate pregnancy well. The risk depends on the underlying heart disease and its complexity, in particular on ventricular and valvular function, functional class and cyanosis.
- All patients 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.
- Pregnancy is contraindicated in patients with pulmonary hypertension or Eisenmenger syndrome due to high risk of maternal mortality.
- Cyanosis poses a significant risk to the fetus, with a live birth unlikely (<12%) if maternal oxygen saturation is <85%.
- An irreversible decline in systemic ventricular function is seen in 10% of patients with TGA corrected with Mustard / Senning repair.
- Although successful pregnancy is possible in selected patients after Fontan operation, these are moderate to high risk pregnancies.

## 3. Aortic Disease

- Pregnancy is a high risk period for all patients with aortic pathology.
- Dissection occurs most often in the last trimester of pregnancy (50%) or the early postpartum period (33%).
- The diagnosis of aortic dissection should be considered in all patients with chest pain during pregnancy.
- In women with Marfan syndrome and aortic root diameters >45 mm pregnancy should be discouraged.
- Approximately 50% of the patients with a bicuspid aortic valve and aortic stenosis have dilatation of the ascending aorta. Dissection does occur, although less frequently than in Marfan patients.
- Caesarean delivery should be considered when the aortic diameter exceeds 45 mm.

## 4. Valvular heart disease

- Moderate and severe mitral stenosis are poorly tolerated during pregnancy and should be treated interventionally pre-pregnancy.
- During pregnancy percutaneous commissurotomy should only be considered when symptoms persist despite medical therapy.
- In aortic stenosis intervention pre-pregnancy is indicated in case of symptoms, LV dysfunction or symptoms during exercise testing.



# Take home messages

- Regurgitant lesions are better tolerated than stenotic lesions. Pre-pregnancy intervention is only indicated when severe regurgitation is accompanied by refractory heart failure or severe ventricular dilatation or dysfunction.
- Mechanical valve prosthesis: Oral anticoagulation (OAC) with vitamin K antagonists is the safest therapy to prevent valve thrombosis and is therapy of choice during the second and third trimester. During the first trimester continuation of OAC should be considered when the required daily dose is low (warfarin <5 mg). Pregnant patients on higher warfarin dose should be considered for unfractionated heparin or low molecular weight heparin (LMWH) with strict dose-adjustment according to aPPT or anti-factor Xa levels (weekly control). At the 36th week of gestation OAC should be discontinued and replaced by dose-adjusted unfractionated heparin or LMWH. When delivery starts while still on OAC, caesarean delivery is indicated to prevent fetal cerebral bleeding.

## 5. Coronary artery disease

- Primary PCI (with bare metal stent) is the treatment of choice in pregnant women with ACS/STEMI.
- Pregnancy may be considered in women with known CAD, if there is no residual ischemia and LVEF >40%.

## 6. Cardiomyopathies

- Peripartum cardiomyopathy includes LV systolic dysfunction without an identifiable cause in the last month of pregnancy or first months postpartum. Treatment follows ESC guidelines for HF, but with reservations regarding medications with possible harmful fetal effects. Prolactin derived peptides may contribute to the pathophysiology and bromocriptine may offer a novel possible specific therapeutic option.
- Deterioration in LV function occurs in up to 50% of cases despite optimal treatment. Subsequent pregnancies carry a recurrence risk of 30–50%. When ejection fraction has not normalized a subsequent pregnancy should be discouraged.
- Women with dilated cardiomyopathy should be informed about the risk of deterioration during gestation and peripartum. A LVEF <40% is a predictor of high risk. LVEF <20% implies a very high mortality and a termination of the pregnancy should be considered.
- Most women with hypertrophic cardiomyopathy tolerate pregnancy well. Use of  $\beta$ -blockers is recommended if tolerated.

## 7. Arrhythmia

- Arrhythmias may become more frequent or may manifest for the first time during pregnancy. 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.
- AV nodal re-entry tachycardia or AV re-entry tachycardia can be terminated by vagal manoeuvres or, if that fails, by intravenous adenosine.
- Life-threatening ventricular arrhythmias during pregnancy are rare. The presence of an ICD does not itself contraindicate future pregnancy.
- Temporary pacing during delivery is recommended in presence of complete heart block and symptoms. The risks of permanent pacemaker implantation are generally low.

# Take home messages

## 8. Hypertension

- Hypertension in pregnancy comprise
  - ✓ pre-existing hypertension,
  - ✓ gestational hypertension
  - ✓ pre-eclampsia
- Pre-eclampsia, defined as gestational hypertension with proteinuria  $>0.3$  g/24 h, is the most common cause of prematurity. It occurs more frequently during the first pregnancy.
- While the benefits of antihypertensive therapy for mild-to-moderate gestational hypertension ( $<160/110$  mmHg) have not been demonstrated in clinical trials, there is consensus that drug treatment of severe hypertension in pregnancy is beneficial.
- Alpha-methyldopa is the drug of choice for long-term management of hypertension during pregnancy. Labetalol has comparable efficacy and can be given intravenously in severe hypertension. Calcium-channel blockers like nifedipine (oral) or isradipine (i.v.) are the drugs of second choice.
- ACE inhibitors, angiotensin II antagonists and direct renin inhibitors are strictly contraindicated in pregnancy.

## 9. 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.
- Increased risk for VTE in pregnancy:
  - ✓ Previous recurrent VTE's
  - ✓ VTE unprovoked or oestrogen – related
  - ✓ Single previous VTE + thrombophilia or family history.
- High risk patients should receive antenatal prophylaxis with LMWH and for 6 weeks postpartum.

## 10. Drug therapy in pregnancy

- There are no uniform recommendations. Different sources of evidence such as U.S. Food and Drug Administration (FDA) classification, internet databases, pharmaceutical industry recommendations have different strength and weaknesses.
- 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.

# Major gaps in evidence

## ▪ General

European databases on pregnancy complications are urgently needed. Foetal and maternal risk assessment need prospective and systematic studies.

## ▪ Congenital heart disease

What is the optimal way of delivery for the different diagnoses?

What is the risk in the different diagnoses for irreversible effect of pregnancy on cardiac function?

## ▪ Aortic disease

What is the optimal way of delivery in women with dilated aorta?

At what diameter should prophylactic aortic surgery be performed?

## ▪ Valve thrombosis

The superiority of unfractionated heparin or low-molecular weight heparin to prevent mechanical valve thrombosis and bleeding during the first trimester is unproven. There are insufficient data concerning optimal anti-factor Xa levels (post-dose as well as pre-dose) to prevent valve thrombosis and bleeding during low molecular weight heparin therapy. Randomized studies comparing OAC vs LMWH during the first trimester are needed.

## ▪ Coronary heart disease

The safety of thienopyridines, GP IIb/IIIa receptor inhibitors and bivalirudin is unknown during pregnancy.

## ▪ Heart failure and peripartum cardiomyopathy

Systematic studies from European countries are not available. The etiology remains uncertain resulting in that no therapeutic but just symptomatic treatment is possible. Novel treatment options (bromocriptine, mechanical assist devices) need validation.

## ▪ Arrhythmia

Definite data on drug efficiency and safety are lacking.

## ▪ Hypertension

Prediction of pre-eclampsia needs improvement.

There is no evidence that drug treatment of mild-to-moderate hypertension in pregnancy is beneficial (most studies have serious limitations in study design such as small number of participants and no longitudinal outcome).

## ▪ VTE

The influence of various single risk factors and the summation of several risk factors on total VTE - risk needs to be defined more exactly in prospective studies and risk scores require prospective validation.

Clinical prediction rules for assigning pretest probabilities of VTE and the use of various diagnostic modalities need validation in pregnant patients.

## ▪ Drug therapy

An European registry for complications of drug therapy in pregnancy is needed. Prospective studies should be designed wherever possible.

To read the parent document as published by the European Society of Cardiology, visit our web site at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

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**Disclaimer:**

The ESC Guidelines represent the views of the ESC which were arrived at after careful consideration of the available evidence at the time they were written. Health professionals are encouraged to take them fully into account when exercising their clinical judgment. The guidelines do not, however, override the individual responsibility of health professionals to make appropriate decisions in the circumstances of the individual patients, in consultation with that patient, and where appropriate and necessary the patient's guardian or carer. It is also the health professional's responsibility to verify the rules and regulations applicable to drugs and devices at the time of prescription.





**EUROPEAN  
SOCIETY OF  
CARDIOLOGY®**

EUROPEAN SOCIETY OF CARDIOLOGY  
2035, ROUTE DES COLLES  
LES TEMPLIERS - BP 179  
06903 SOPHIA ANTIPOLIS CEDEX - FRANCE  
PHONE: +33 (0)4 92 94 76 00  
FAX: +33 (0)4 92 94 76 01  
E-mail: [guidelines@escardio.org](mailto:guidelines@escardio.org)

For more information

**[www.escardio.org/guidelines](http://www.escardio.org/guidelines)**