

PREGNANCY RELATED PROBLEMS AND SOLUTIONS Image: Comparison of the second second

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CPVT first reported in 1975

Up to 30-50% experience cardiac arrest before 30 years of age



Recommendations	Class*	Level ^b
Management of supraventricular tachycardia (SVT)		
For acute conversion of paroxysmal SVT, vagal manoeuvre followed by Lv. adenosine is recommended.	1	С
Immediate electrical cardioversion is recommended for acute treatment of any tachycardia with haemodynamic instability.	1	С
For long-term management of SVT oral digoxin ^c or metoprolol/propranolol ^{r,d} , is recommended.	1	С
For acute conversion of paroxysmal SVT, Lv. metoprolol or propranolol should be considered.	lla	С
For long-term management of SVT, oral sotalol ^e or flecalnide ¹ should be considered if digoxin or a β-blocking agent fails.	lla	С
For acute conversion of paroxysmal SVT, Lv. verapamil may be considered.	llb	С
For long-term management of SVT, oral propafenone ⁴ , or procalnamide may be considered as a last option If other suggested agents fail and before amiodarone ⁴ is used.	Ш	с
For long-term management of SVT, oral verapamil ^e may be considered for rate regulation if the other AV nodal-blocking agents fail.	llb	С
Atenoiol ^d should not be used for any arrhythmia.	Ш	С
Management of ventricular tachycardia (VT)		
The implantation of an ICD, if clinically indicated, is recommended prior to pregnancy but is also recommended whenever indicated, during pregnancy.	1	с
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.	1	с
For long-term management of idiopathic sustained VT oral metoprolol ^{c,d} , propranolol ^{c,d} or verapamil ^{c,f} is recommended.	1	С
Immediate electrical cardioversion of VT is recommended for sustained, unstable, and stable VT.	1	С
For acute conversion of VT that is sustained, haemodynamically stable, and monomorphic, Lv. sotalol® or procainamide should be considered.	lla	с
Implantation of permanent pacemakers or ICDs (preferably one chamber) should be considered with echocardiographical guidance, especially if the fetus is beyond 8 weeks gestation.	lla	с
For acute conversion of VT that is sustained, monomorphic, haemodynamically unstable, refractory to electrical cardioversion or not responding to other drugs, i.v. amiodarone ^e should be considered.	lla	с
For long-term management of idiopathic sustained VT oral sotalol®, flecainide ⁴ , propafenone ⁴ should be considered if other drugs fail.	lla	С

Catheter ablation may be considered in the case of drug-refractory and poorly tolerated tachycardias.

ESC Guidelines on the management of cardiovascular diseases during pregnancy

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) Chan L., Int J obst Anest 2002; 11: 122 Walker N, Acta Cardiol 2009;64(3):419 Burrows K, PACE 2013;36:e77 Friday K., Pediatric Cardiol 2015;36:1542 Romagano M., Obst Gynecol 2016;127:735 Aziz Clin Case Reports 2016;4:361

- 1. Hemodynamic changes in maternal circulatory
- 2. Poor placental blood flow during arrhythmia
- 3. Fetal adverse effect from medication
- 4. Fetal adverse effect from ICD shock

Hemodynamic changes in maternal circulatory

1. Increase in plasma volume (max at 24 weeks)

2. 30-50% increased in CO
-early pregnancy by stroke volume
-since 20 week by heart rate increased

3. SBP in first trimester decreased by 10 mmHg

4. Heart dilatation up to 30%, systolic function may decreased in 3rd trimester

Hemodynamic changes in maternal circulatory

Increased in intervascular volume by 40% Decrease in total protein concentration Induced hepatic stimulation by progesteron

Lower drug concentration

Hemodynamic changes in maternal circulatory

Role of estradiol

-play role in regulation of cardiac channels in animals models

-down regulating B1 adrenergic receptors

-decreased arrhythmia burden or increase myocardium sensitivity to sympatetic stimulations

Poor placental blood flow during arrhythmia Umbilical artery flow,



Normal flow



Decrease latediastolic flow

Fetal adverse effect from medication beta
 blocker (BB)
Bateman, Pediatrics 2016

10 585 pregnancies exposed to BB Risk for hypoglycemia 4,3 vs 1,2% Risk for bradycardia 1,6 vs 0,5%

Davis, Pharmacoepidemiol Drug Saf 2011 584 neonatal exposed to BB 3-fold increase risk for hypoglycaemia 804 neonatal exposed to CaB risk for convulsions Increased risk for feeding problem, perinatal jaundice

Fetal advers effect from mediaction beta blocker (BB)

Brosset Press Med. 1988 Hypoglycemia 42% of newborns Bradycardia 47% of newborns Lasting 5-10 days post delivery

Lip Am J Cardiol 1997 Atenolol causing intrauterine growth retardation

Fetal adverse effect from medication- beta blocker (BB)

Beta blockers

-reduce blood flow through placenta
-may be cause of intrauterine growth retardation
-cross placenta and exert physiologic effects
increase level of insuline
decrease glucagon
cause bradycardia

Effect depends on dose

Fetal adverse effect from medication-Flecainid

Ekiz J Matern Fetal Neonatol Med. 2017, 23;1 17 fetuses on Flecainid

Strizek Heart Rhythm 2016, 13;1286 28 fetuses on Flecainid

Vigneswaran Heart Rhythm 2014, 32 fetuses on Flecainid

Uzun Cardiol Young 2012, 22;372 35 fetuses on Flecainid

No side effects

Fetal adverse effect from ICD shock Schuler Europace 2012 18 pregnansis 2 ATP 1 VF therapy No advers effect on neonate Boule Europace 2014 20 pregnansis, 14 delveries 3 VF therapy Miyoshi Circul 2013 6 pregnansis 1 ATP

Avoid arrhythmic event
 Explain the need for treatment
 Use proper dosage
 Optimize ICD programing

2. Minimalize sympathetic activation during delivery

How to care fetus/newborn?

- 1. Follow biometric parameters of fetus monthly.
- 2. Monitor glycaemia level and rhythm after delivery
- 3. Monitor fetal heart rhythm

Hypoglycemia and bradycardia post maternal BB therapy is self-resolving and without long term sequelae

Conclusions

- 1. Cardiologist should be involved in medical care in CPVT pregnancy
- 2. Special care should be focus on medication compliance
- 3. While on BB

-fetus biometric parameters should be taken every monthly

-hypoglycemia and/or bradycardia should be follow up to 10 days

4. Flecainide and ICD can be save