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CHLOPENNÍ VADY V TĚHOTENSTVÍ

Konflikt zájmů: 0

- **Před těhotenstvím**
- Hemodynamické změny v graviditě
- Rizika spojená s graviditou
- Zhodnocení rizika v těhotenství
- Způsob porodu
- Profylaxe bakteriální endokarditis u porodu
- Antikoagulační terapie u chlopenních náhrad

TABLE 1 Pre-Conception Counseling Considerations: Issues to Address With the Patient

Pregnancy risk stratification • Maternal cardiac risk • Maternal obstetric risk • Fetal and neonatal risks
Long-term effects of pregnancy on the heart
Maternal life expectancy
Genetic consultation
Contraception safety and efficacy
Modification of cardiac medications
Optimization of cardiac status
Planning for pregnancy*

*For women who are pregnant, follow-up during pregnancy should be discussed. The European Society of Cardiology guidelines on the management of cardiovascular diseases during pregnancy suggest that women with World Health Organization (WHO) I lesions should have 1 to 2 cardiac visits during pregnancy, WHO II lesions should have cardiac follow-up every trimester, WHO III lesions should have monthly or bimonthly cardiac follow-up, and WHO IV lesions (who do not elect to terminate the pregnancy) should have monthly or bimonthly follow-up (4).

Elkayam U et al. J Am Coll Cardiol 2016;68:396-410.

Řešení chlopenní vady před graviditou

- Gravidita možná s chlopenní vadou
- Gravidita nemožná s chlopenní vadou:
  - biochlopeň jako přechodně řešení ?
  - mechanická chlopenní náhrada ??

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Hemodynamické změny v graviditě

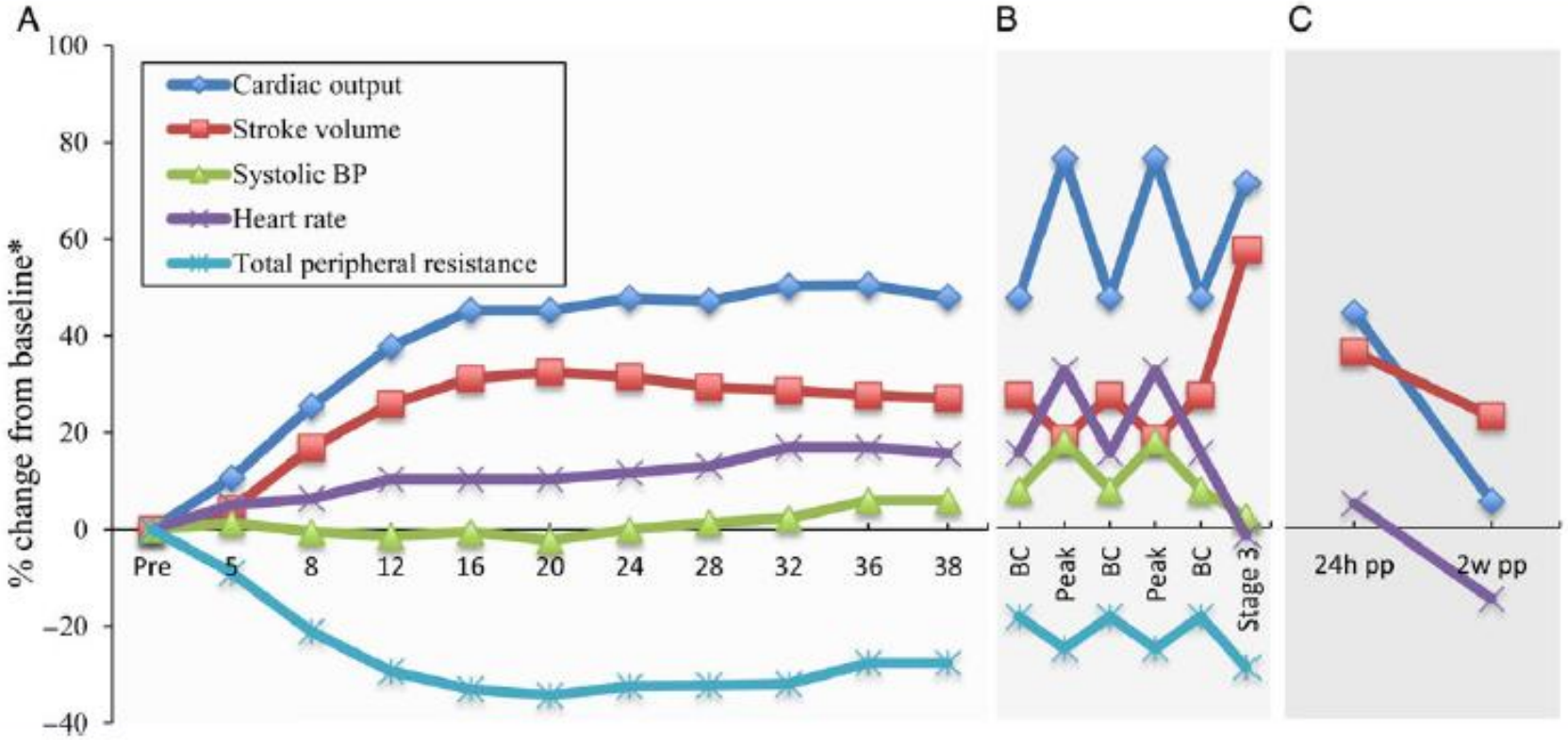

Figure 2 Haemodynamic changes during pregnancy, peripartum, and postpartum. (*A*) Pregnancy (weeks of gestation). Modified from Robson *et al.*[12] (*B*) Peripartum. Modified from: Adams *et al.*[13] BC, between contractions; Peak, at the peak of contraction; Stage 3, at the time of uterine contraction. (*C*) Postportum. Modified from Robson *et al.*[14,15] 24 h pp, 24 h postpartum; 2w pp, 2 weeks postpartum. *For cohorts in (*B*) and (*C*), relative changes from baseline were compared with the baseline values of the cohort from (*A*).

Greutmann M et al. Eur Heart J 2015;36:2491-9

Echokardiografické změny v graviditě

Echocardiographic variables	Changes during pregnancy
Left ventricular dimension and volume	Increases
Left ventricular wall thickness and left ventricular mass	Increases
Left ventricular ejection fraction	Unchanged
Left ventricular fractional shortening	Unchanged
Left ventricular radial and longitudinal strain rate	Increases
Aortic root diameter	Mildly increases
Right ventricular dimension and volume	Increases
Right ventricular ejection fraction	Unchanged
Left atrial size and volume	Increases
Stroke volume (as measured using pulsed wave Doppler)	Increases
Mitral E wave velocity	Increases, then decreases
Mitral A wave velocity	Increases
Peak pulmonary artery systolic pressure estimated using tricuspid regurgitation jet	Unchanged

Cardiac chamber dimensions. This table was adapted from Naqvi and Elkayam [7]; copyright Elsevier

LVOT left ventricular outflow tract, *TR* tricuspid regurgitation, *VTI* velocity-time integral

Liu S et al. Curr Cardiol Rep 2016;18:92

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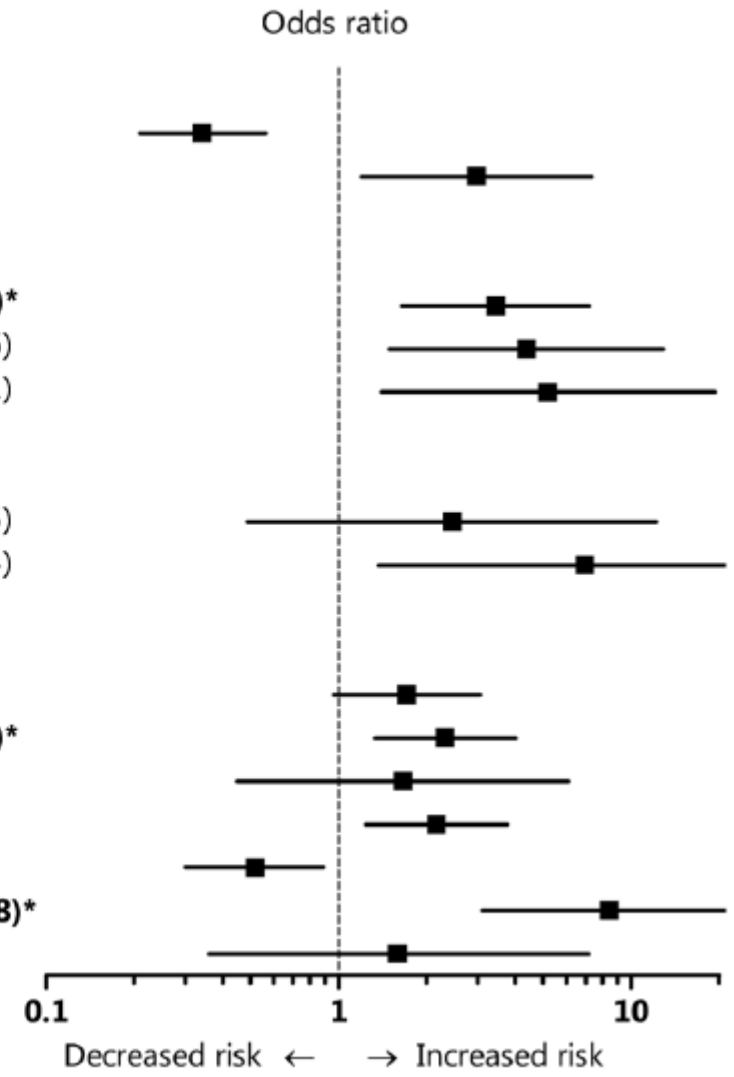
Parametry předpovídající komplikace v graviditě

	n (total)	Event rate	OR (95% CI)
Pre-eclamptic toxaemia			
Living in an emerging country	502	1.2%	0.34 (0.21-0.56)
Nulliparity	273	4.8%	2.95 (1.19-7.30)
Fetal/neonatal death			
Anticoagulant use	**242**	**8.3%**	**3.44 (1.65-7.17)***
Living in an emerging country	502	5.8%	4.39 (1.50-12.86)
Multiple gestation	25	12.0%	5.20 (1.40-19.31)
Spontaneous preterm birth			
Systemic ventricle dysfunction	16	12.5%	2.45 (0.49-12.15)
Diabetes Mellitus prepregnancy	12	16.7%	6.94 (1.37-35.04)
Small for gestational age			
Mitral valve disease	537	10.2%	1.71 (0.96-3.04)
Stenotic disease	**451**	**11.7%**	**2.31 (1.33-4.03)***
Systemic ventricle dysfunction	16	21.4%	1.66 (0.45-6.11)
Anticoagulant use	242	11.7%	2.16 (1.24-3.78)
Living in an emerging country	502	6.8%	0.52 (0.30-0.89)
Multiple gestation	**25**	**40.0%**	**8.44 (3.11-22.88)***
Current smoking	19	25.0%	1.59 (0.36-7.12)



van Hagen et al. Heart 2017

Rizika spojená s chlopenní vadou v těhotenství

	Normal	Reg ($n = 1321$)	*P*-value	CHD ($n = 872$)	VHD ($n = 334$)	CMP ($n = 88$)	IHD ($n = 25$)	*P*-value
Maternal mortality (%)[a]	0.007	1.0	<0.001	0.5	2.1	2.4	0.0	0.031
Maternal hospital admission (%)[b]	2	26	<0.001	20	38	33	28	<0.001
Cardiac								
Heart failure (%)[b]	0	12	<0.001	8.0	18	24	8.0	<0.001
Supraventricular arrhythmias (%)[c]	<0.5	0.9	<0.001	0.7	3.0	1.1	0.0	0.025
Ventricular arrhythmias (%)[c]	<0.5	2.0	<0.001	1.6	0.6	11	0.0	<0.001
Obstetrics complications								
Pregnancy-induced hypertension (%)[d]	2.5	2.4	0.93	2.3	2.4	3.4	4.0	0.61
(pre-)Eclampsia (%)[d]	4	3.3	0.23	2.2	3.9	11	4.0	0.001
Caesarean section (%)[a]	23	41	<0.001	38	42	58	60	0.001
Post-partum haemorrhage (%)[e]	5	2.9	<0.001	2.4	5.1	0.0	0.0	0.021
Foetal								
Apgar score <7 (%)[a]	1	10	<0.001	6.5	15	18	24	<0.001
Preterm birth <37 weeks (%)[a]	8	15	<0.001	13	16	30	36	<0.001
Foetal death (%)[a]	0.35	1.7	<0.001	0.5	3.9	4.5	4.0	<0.001
Neonatal death (%)[a]	0.4	0.6	0.27	0.6	0.3	1.1	4.0	0.13
Mean birth weight (g)[f,g,h]	3190	3010	<0.001	3056	2959	2878	2662	0.001
Pregnancy duration (weeks)[a]	40	38	<0.001	38	38	37	36	<0.001

Roos-Hesselink JW et al. Eur Heart J 2013;34:657-65.

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WHO klasifikace rizika u těhotných se srdečním postižením

Risk class	Risk of pregnancy by medical condition
I	No detectable increased risk of maternal mortality and no/mild increase in morbidity.
II	Small increased risk of maternal mortality or moderate increase in morbidity.
III	Significantly increased risk of maternal mortality or severe morbidity. Expert counselling required. If pregnancy is decided upon, intensive specialist cardiac and obstetric monitoring needed throughout pregnancy, childbirth, and the puerperium.
IV	Extremely high risk of maternal mortality or severe morbidity; pregnancy contraindicated. If pregnancy occurs termination should be discussed. If pregnancy continues, care as for class III.

Regitz-Zagrosek V et. al. Eur Heart J 2011;32:3147-97

Conditions in which pregnancy risk is WHO I
• Uncomplicated, small or mild - pulmonary stenosis - patent ductus arteriosus - mitral valve prolapse
• Successfully repaired simple lesions (atrial or ventricular septal defect, patent ductus arteriosus, anomalous pulmonary venous drainage).
• Atrial or ventricular ectopic beats, isolated

Regitz-Zagrosek V et. al. Eur Heart J 2011;32:3147-97

Conditions in which pregnancy risk is WHO II or III
WHO II *(if otherwise well and uncomplicated)*
• Unoperated atrial or ventricular septal defect
• Repaired tetralogy of Fallot
• Most arrhythmias
WHO II–III *(depending on individual)*
• Mild left ventricular impairment
• Hypertrophic cardiomyopathy
• Native or tissue valvular heart disease not considered WHO I or IV
• Marfan syndrome without aortic dilatation • Aorta <45 mm in aortic disease associated with bicuspid aortic valve
• Repaired coarctation

Regitz-Zagrosek V et. al. Eur Heart J 2011;32:3147-97

WHO III
• Mechanical valve
• Systemic right ventricle
• Fontan circulation
• Cyanotic heart disease (unrepaired)
• Other complex congenital heart disease
• Aortic dilatation 40–45 mm in Marfan syndrome • Aortic dilatation 45–50 mm in aortic disease associated with bicuspid aortic valve

Regitz-Zagrosek V et. al. Eur Heart J 2011;32:3147-97

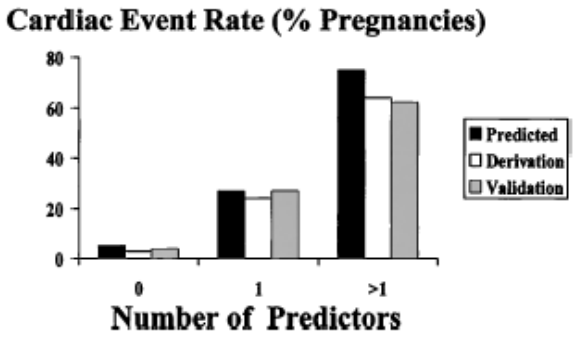
Conditions in which pregnancy risk is WHO IV (pregnancy contraindicated)
• Pulmonary arterial hypertension of any cause
• Severe systemic ventricular dysfunction (LVEF <30%, NYHA III–IV)
• Previous peripartum cardiomyopathy with any residual impairment of left ventricular function
• Severe mitral stenosis, severe symptomatic aortic stenosis
• Marfan syndrome with aorta dilated >45 mm • Aortic dilatation >50 mm in aortic disease associated with bicuspid aortic valve
• Native severe coarctation

Regitz-Zagrosek V et. al. Eur Heart J 2011;32:3147-97

Jiná klasifikační schémata

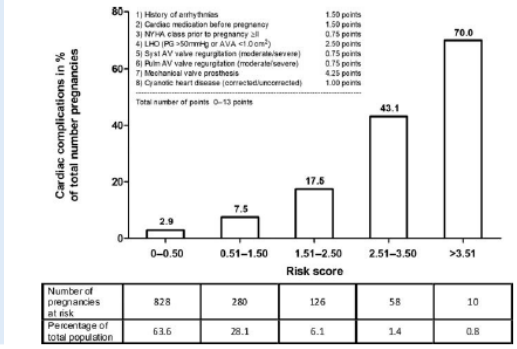
CARPREG study (14)

- Poor functional class (NYHA functional class III or IV) or cyanosis
- Systemic ventricular ejection fraction <40%
- Left heart obstruction
- Cardiac event prior to pregnancy



ZAHARA study (17)

- History of arrhythmias (weighted score 1.5)
- Cardiac medications before pregnancy (weighted score 1.5)
- NYHA functional class prior to pregnancy ≥II, left heart obstruction (weighted score 0.75)
- Left heart obstruction (weighted score 2.5)
- Systemic atrioventricular valve regurgitation (weighted score 0.75)
- Pulmonary atrioventricular valve regurgitation (weighted score 0.75)
- Mechanical valve prosthesis (weighted score 4.25)
- Cyanotic heart disease (weighted score 1.0)



Number of pregnancies at risk	828	280	126	58	10
Percentage of total population	63.6	28.1	6.1	1.4	0.8

Elkayam U et al. J Am Coll Cardiol 2016;68:396-410.

Riziko pro jednotlivé chlopenní vady

Table 1 Pregnancy risk for women with isolated valve lesions, normal ventricular size and function and no other risk factors

WHO risk	Mitral	Aortic	Pulmonary	Tricuspid	Presence of other lesions or risk factors
WHO 1	Trivial MR	Trivial AR	Mild PS, PR	Mild TR	RISK INCREASES
WHO 2	Mild MS, MR	Mild AS, AR	Moderate PS, PR	Mild TS, moderate TR (both rare in isolation)	
WHO 2–3	Moderate MR	Moderate AR	Severe PR		
WHO 3	Severe MR, moderate MS	Severe AR, moderate to severe AS	Severe PS	Severe TR and TS (but very rare in isolation—likely to be part of complex underlying disease)	
WHO 4	Severe MS	Severe and critical AS			

AR, aortic regurgitation; AS, aortic stenosis; MR, mitral regurgitation; MS, mitral stenosis; PA, pulmonary artery; PR, pulmonary regurgitation; PS, pulmonary stenosis; TR, tricuspid regurgitation; TS, tricuspid stenosis.

- bikuspidální aortální vada – riziko i postižení aorty (dilatace)

Thorne S. Heart 2016;102:1410-7

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Kardiální indikace pro porod císařským řezem

Box 3 Conditions in which caesarean section is preferred over vaginal delivery

- Women with an ascending aorta diameter >45 mm
- Pre-term labour while on oral anti-coagulation
- Women with severe aortic stenosis experiencing symptoms during pregnancy (preferably general anaesthesia and endotracheal intubation)
- Severe heart failure

V ostatních případech vaginální porod, dle potřeby ve II. době porodní s vakuumextrakcí

Greutmann M et Pieper RG. Eur Heart J 2015;36:2491-9.

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Prevence BE pouze u vysoce rizikových jedinců

Recommendations	Class[a]	Level[b]
Antibiotic prophylaxis should be considered for patients at highest risk for IE: (1) Patients with any prosthetic valve, including a transcatheter valve, or those in whom any prosthetic material was used for cardiac valve repair. (2) Patients with a previous episode of IE. (3) Patients with CHD: (a) Any type of cyanotic CHD. (b) Any type of CHD repaired with a prosthetic material, whether placed surgically or by percutaneous techniques, up to 6 months after the procedure or lifelong if residual shunt or valvular regurgitation remains.	IIa	C
Antibiotic prophylaxis is not recommended in other forms of valvular or CHD.	III	C

Habib G et al. Eur Heart J 2015;36:3075-128.

Profylaxe BE u porodu ?

Recommendations	Class[a]	Level[b]
B. Respiratory tract procedures[c]		
• Antibiotic prophylaxis is not recommended for respiratory tract procedures, including bronchoscopy or laryngoscopy, or transnasal or endotracheal intubation	III	C
C. Gastrointestinal or urogenital procedures or TOE[c]		
• Antibiotic prophylaxis is not recommended for gastroscopy, colonoscopy, cystoscopy, vaginal or caesarean delivery or TOE	III	C
D. Skin and soft tissue procedures[c]		
• Antibiotic prophylaxis is not recommended for any procedure	III	C

Habib G et al. Eur Heart J 2015;36:3075-128.

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Rizika spojená s antikoagulační terapií/mechanickou chlopenní náhradou

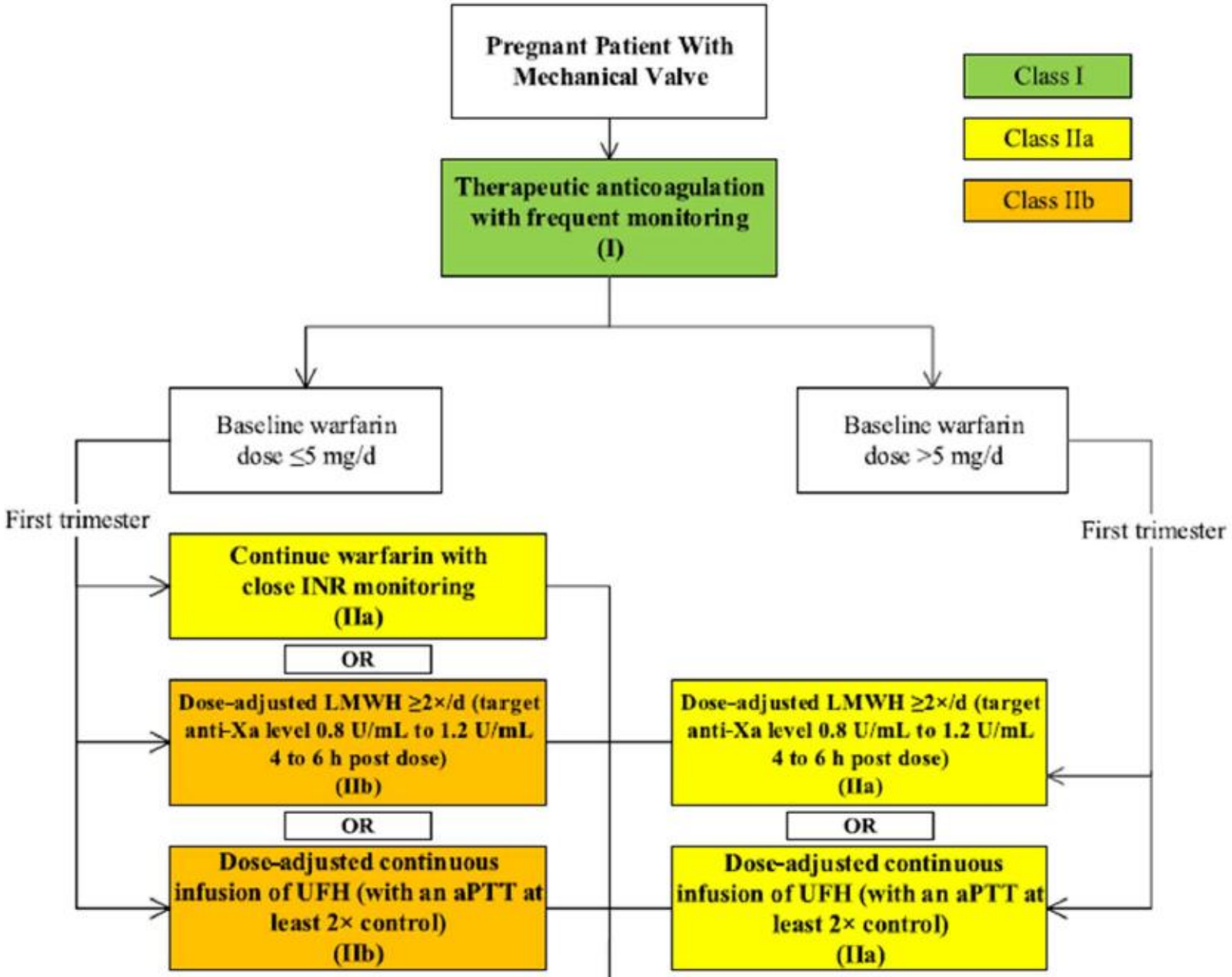
Table 1 Adverse maternal and fetal outcomes in women with mechanical heart valves according to the type of anticoagulation therapy used during pregnancy.

Anticoagulation regimen			
Adverse outcomes	**OA**	**OA/H**	**Heparin**
Maternal mortality	1.1 (0.5 to 2.2)	1.7 (0.8 to 4.5)	4.7 (2.2 to 10.7)
TECs including PVT	2.9 (1.9 to 4.1)	7.1 (4.7 to 10.3)	13.4 (9.7 to 20.5)
Maternal bleeding	4.2 (1.4 to 6.8)	3.4 (2.3 to 6.6)	10.8 (2.8 to 27.3)
Fetal wastage—any cause	32.9 (25.7 to 49.2)	19.9 (15.9 to 31.4)	38.8 (32 to 46.8)
Embryopathy/congenital malformations	3.7 (1.9 to 4.8)	0.4 (0.2 to 2.7)	0
Prematurity	7.4 (2.1 to 9.6)	8.1 (3.4 to 12.8)	9.5 (3 to 23.6)

Adapted from Hassouna and Allam.[18]
Values are presented as a percentage and (95% CIs).
OA, oral anticoagulants alone throughout pregnancy; OA/H, oral anticoagulants substituted by heparin during the first trimester; Heparin, heparin alone throughout pregnancy; PVT, prosthetic valve thrombosis; TECs, thromboembolic complications.

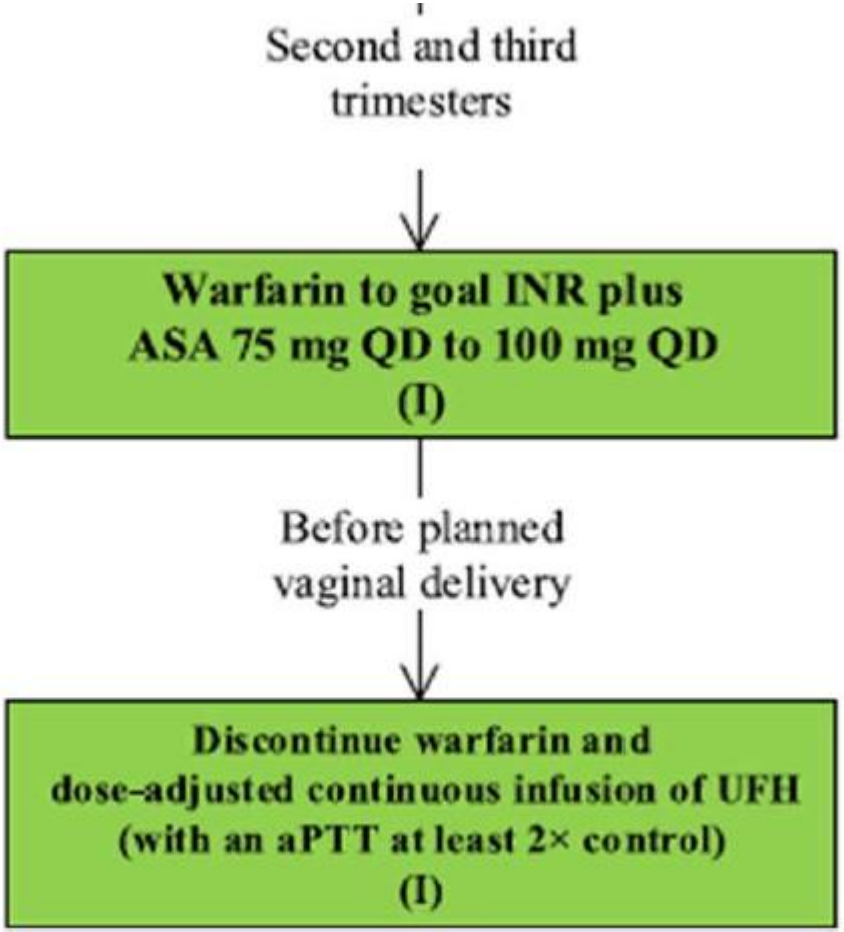
Bhagra CJ et al. Heart 2017;103:244-252

Antikoagulační terapie u mechanické chlopenní náhrady v graviditě I



Bhagra CJ et al. Heart 2017;103:244-252

Antikoagulační terapie u mechanické chlopenní náhrady v graviditě II



- úzká spolupráce s hematologem (trombotickým centrem)

Bhagra CJ et al. Heart 2017;103:244-252

Závěr

- Většina chlopenních vad nepředstavuje větší problém v graviditě
- Nejhorším problémem jsou jednak závažnější aortální a mitrální stenóza a dále pak i mechanické chlopenní náhrady

DĚKUJI ZA POZORNOST