

# Pathologies Maternelles & Grossesse:

## Le point de vue de l'Anesthésiste – Réanimateur

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**Samedi 12 juin 2021**  
**« Pathologies maternelles et grossesse »**  
**BluePoint, Liège**



# Synopsis



9h00 Introduction  
**Pierre Bernard** (UCL) / Christine Van Linthout (ULg)

Présidence : Sébastien Grandfils (ULiège) et Clotilde Lamy (ULB)

9h10 Adaptation physiologique à la grossesse  
**Patrick Emonts** (ULg)

9h35 Obésité et grossesse  
**Jacky Nizard** (Pitié Salpêtrière Paris)

10h00 Pathologies psychiatriques et grossesse  
**Chloé Leemans** (Erasmé)

10h30 Pause-café

Présidence : Patrick Emonts (ULiège) et Florence Coppin (Luxembourg)

10h50 Mise au point radiologique pendant la grossesse  
**Emmanuel Agneessens** (Cliniques St-Pierre)

11h15 Pathologies maternelles mises en évidence par le NIPT  
**Mina Mhallem** (UCL) et **Kris Van Den Bogaert** (UZ Leuven)

11h40 Grossesse et pathologie cardiaque maternelle  
**Agnes Pasquet** (UCL)

12h10 Temps de midi

Présidence : Leila Ghassemi (ULiège – CHC) et Thomas Pezin (ULB)

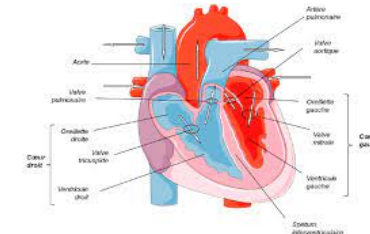
13h00 Pathologies pulmonaires et grossesse  
**Sophie Gohy** (UCL)

13h25 Le point de vue de l'anesthésiste  
**Pierre-Yves Dewandre** (ULiège)

13h50 Impact du Covid en Belgique sur la périnatalité à partir du registre Boss  
**Anneke Vercoetere** (ULB)

14h15 Conclusions  
**Christine Van Linthout**

• **Cardiopathies**



• **Obésité**



• **Morbi-mortalité maternelle**

• **Prise en charge anesthésique**

# Pathologies maternelles & Mortalité maternelle



Maternal, Newborn and  
Infant Clinical Outcome  
Review Programme



## Saving Lives, Improving Mothers' Care

Lessons learned to inform maternity care from the  
UK and Ireland Confidential Enquiries into Maternal  
Deaths and Morbidity 2015-17



November 2019



**Mortalité**  
**9.2 / 100.000**

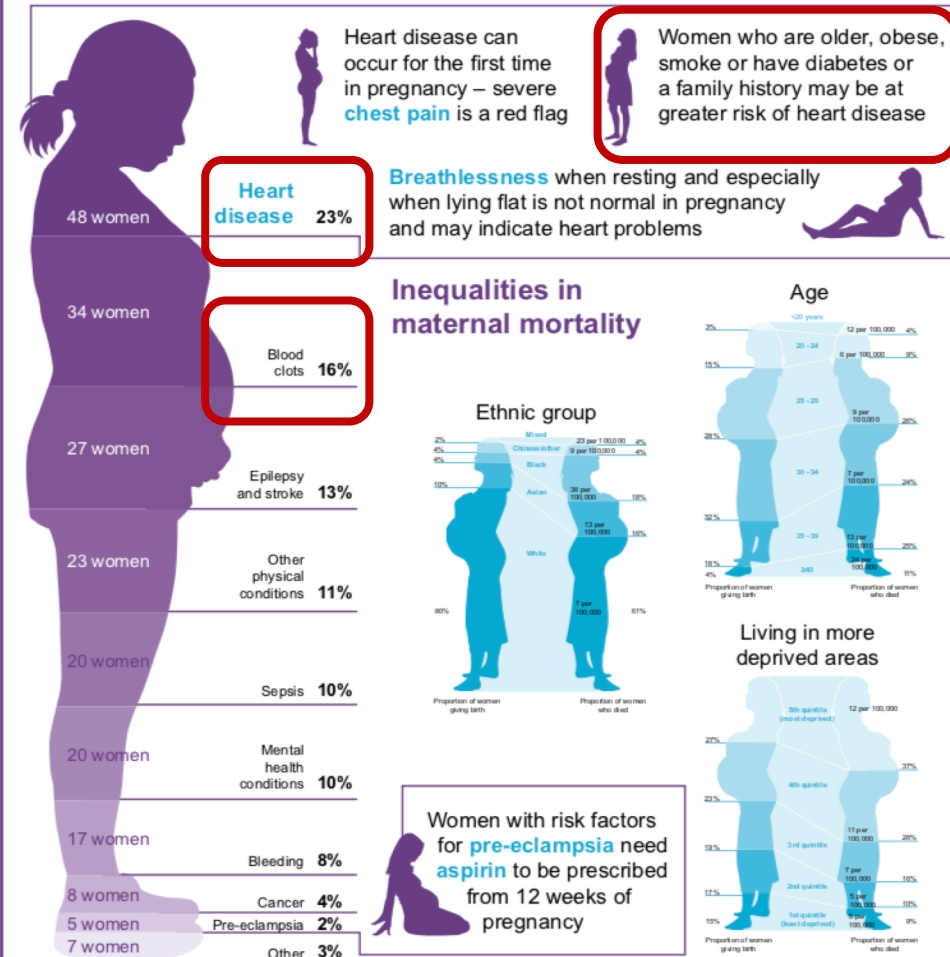
**Surpoids: 24%**  
**Obèses: 34%**

## Key messages from the report 2019



In 2015-17, **209 women died** during or up to six weeks after pregnancy, from causes associated with their pregnancy, among 2,280,451 women giving birth in the UK.  
**9.2 women** per 100,000 died during pregnancy or up to six weeks after childbirth or the end of pregnancy.

### Causes of women's deaths



# Mortalité maternelle

## Causes

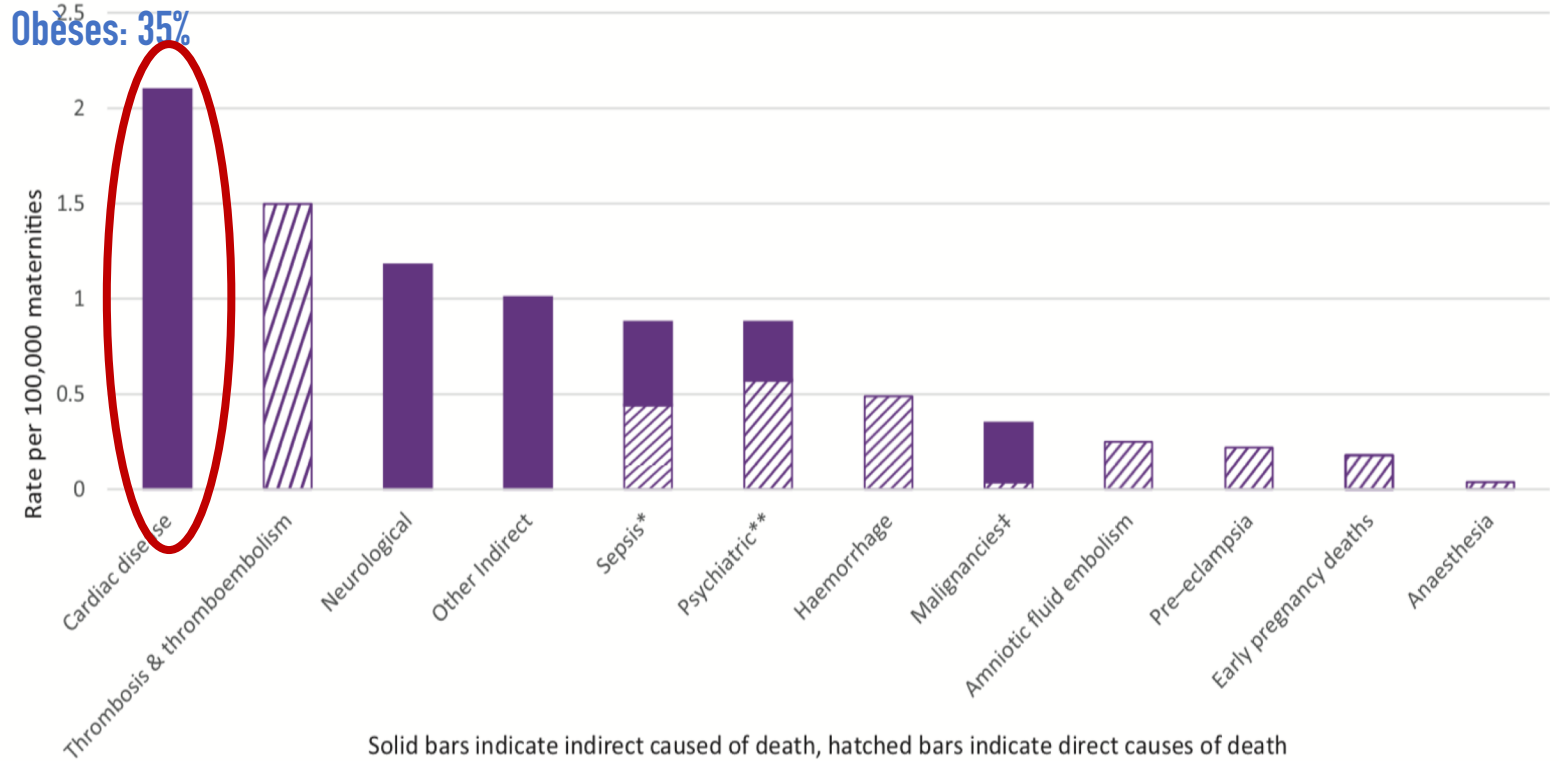


Figure 2.3: Maternal mortality by cause 2015-17

Décès d'origine cardiaque:

Surpoids: 20%

Obèses: 35%





## Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium

Green-top Guideline No. 37a

April 2015

### 4.1.2 Obesity

Sixty percent of women who died from PE in the UK between 2003 and 2008 were obese (body mass index [BMI] 30 or higher)<sup>3,4</sup> compared with the 20% prevalence of obesity in women aged 16–44 in the Health Survey for England 2010.<sup>39,40</sup> Obesity is a risk factor for VTE in pregnancy<sup>7,12,31–33</sup> and the risk is higher with increasing obesity.<sup>41</sup> It is associated with a higher risk of PE (adjusted OR [aOR] 14.9, 95% CI 3.0–74.8) than of DVT (aOR 4.4, 95% CI 1.6–11.9).<sup>33</sup>

# Pathologies maternelles & Morbidity maternelle sévère



Original Article

Maternal admissions to intensive care units in France: Trends in rates, causes and severity from 2010 to 2014

Y. Barry <sup>a,\*</sup>, C. Deneux-Tharaux <sup>b</sup>, M. Saucedo <sup>b</sup>, V. Goulet <sup>c</sup>, I. Guseva-Canu <sup>a,d</sup>,  
N. Regnault <sup>a,1</sup>, A.A. Chantry <sup>b,c,1</sup>

- Hémorragies: 40%
- HTA-PE: 25%
- Cardio: 11%
- Sepsis: 8%
- AVC: 6%
- MTEV: 5%
- Respi: 5%
- Renal: 1%
- Neuro: 1%

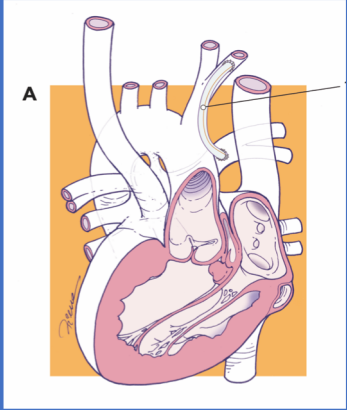
Admission en USI  
4/1000



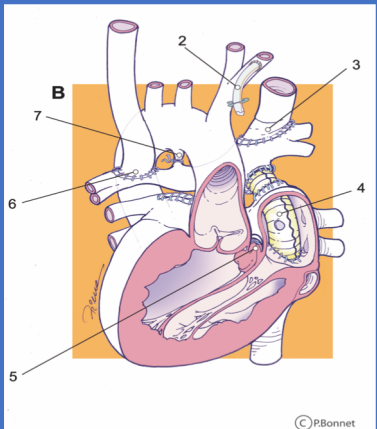


# Anesthésie obstétricale & Cardiopathies





## Case report



- *Pregnancy and delivery in a patient with a **Fontan circulation** and primary ciliary dyskinesia: a case report.*

*Grandfils S, Dewandre PY, Bonnet P, Radermecker MA, Nisolle M, Kridelka F, Emonts P. (2021, in press)*

G1P0 29 ans

ATCD cardiopathie complexe (Hétérotaxie)

Situs inversus+ malformation vasculaire complexe

Ventricule unique: AP + Ao

Sténose pulmonaire

2VCS

CIA

Atrésie mitrale

Retour veineux pulm anormal : OD + OG

Perfusion pulm insuffisante et hypoxie

2 correction chirurgicales successives

3 ans: Blalock: Shunt SCI-AP

8 ans: **Fontan modifié**

Résultat: **1 ventricule, 2 circulations en serie**

Sang veineux systémique progressant dans la circulation pulmonaire sur l'inertie résiduelle sans contraction ventriculaire



- Souhait de grossesse
- NYHA 1
- FEV 64%
- ECG: qq ESV
- Holter: pas d'arythmie supraventriculaire
- Ergospirométrie: Capacité fonctionnelle ok
- EFR : OK
- Consultation pré-conceptionnelle
- FIV
- Grossesse unifoetale évolution sp
- Suivi cardiologique trimestriel puis mensuel
- Induction à 38 SA

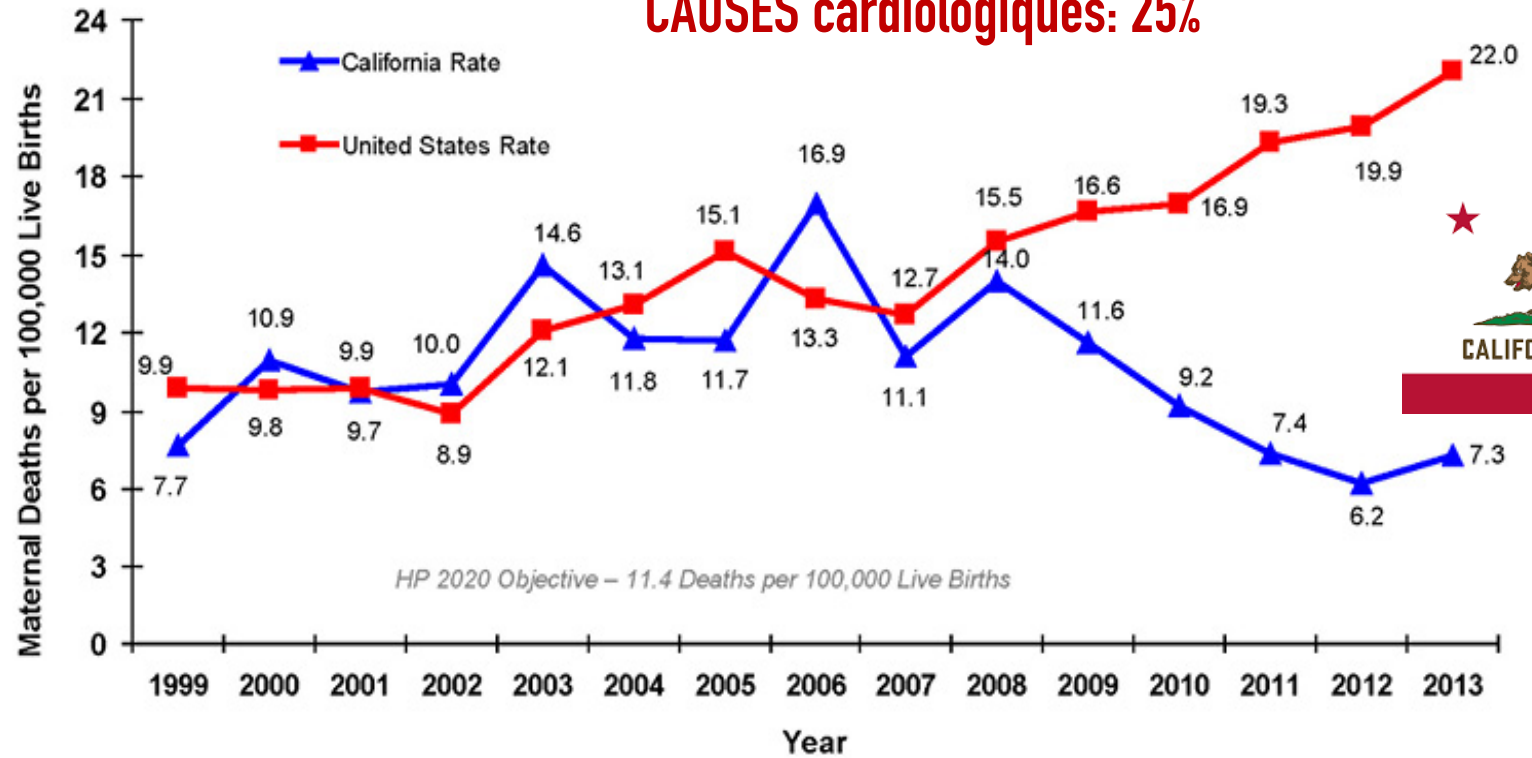
- **Analgésie péridurale** dès le début du travail
- **Monitoring hémodynamique** non invasif continu
- **Extraction instrumentale** de principe pour éviter valsalva et effets sur retour veineux (2800 g, Apgar 8/9/9)
- **HPP** immédiate: délivrance manuelle + Carbetocine
- Postpartum sp
- QS J5
- Follow up & 1 an sp

# Maternal Mortality Rate, California and United States; 1999-2013



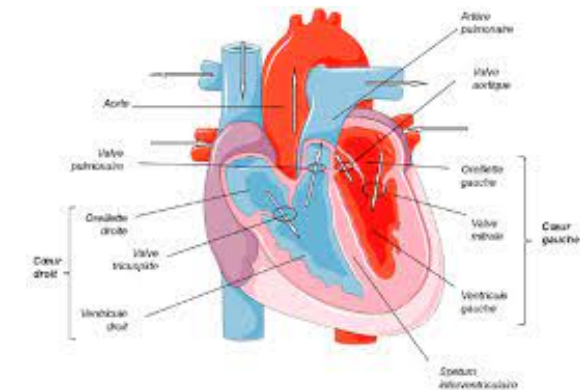
Mortalité maternelle

**CAUSES cardiologiques: 25%**



# Cardiopathies & Grossesse

- Age maternel
- Comorbidités
  - HTA
  - Diabète
  - Obésité
- Cardiopathies congénitales opérées





# Team-Based Care of Women With Cardiovascular Disease From Pre-Conception Through Pregnancy and Postpartum

JACC Focus Seminar 1/5

CENTRAL ILLUSTRATION The Cardio-Obstetrics Model of Care



- Cardiologue
- Obstétricien
- Périnatologiste
- Anesthésiste



- Stratification du risque
- Niveau de maternité requis
- Prise en charge anesthésique
- Monitoring nécessaire
- Anticipation
  - Césarienne urgente
  - HPP
  - Arythmies
  - Décompensation

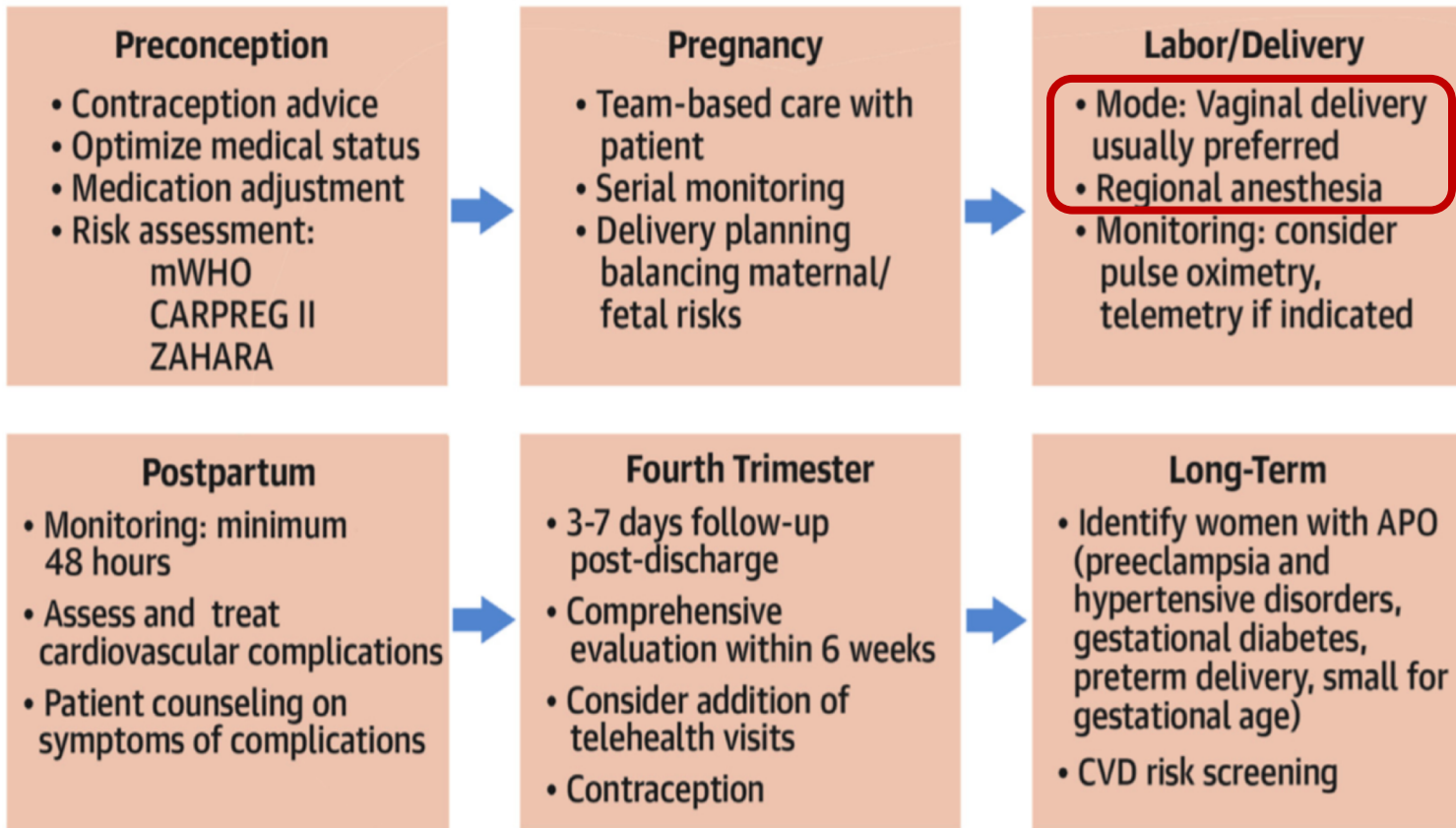
JACC VOL. 77, NO. 14, 2021

APRIL 13, 2021:1763-77

## Pregnancy Heart Team



# Pregnancy Heart Team



Davis, M.B. et al. J Am Coll Cardiol. 2021;77(14):1763-77.

## CARPREG

## ZAHARA

**TABLE 1 CARPREG II Risk Prediction Model**

CARPREG II Predictors	Points
Prior cardiac event or arrhythmia	3
Baseline NYHA functional class III to IV or cyanosis	3
Mechanical valve	3
Ventricular dysfunction	2
High-risk left-sided valve disease/LVOT obstruction	2
Pulmonary hypertension	2
Coronary artery disease	2
High-risk aortopathy	2
No prior cardiac intervention	1
Late pregnancy assessment	1
CARPREG II Score	Predicted Risk, %
0 to 1	5
2	10
3	15
4	22
>4	41

CARPREG = Cardiac Disease in Pregnancy Study; LVOT = left ventricular outflow tract; NYHA = New York Heart Association.

**TABLE 2 ZAHARA Risk Prediction Model Derived From Patients With Congenital Heart Disease**

ZAHARA Predictors	Points
Prior arrhythmia	1.5
Cardiac medications before pregnancy	1.5
NYHA functional class $\geq$ II	0.75
Left heart obstruction	2.5
Moderate or severe mitral regurgitation	0.75
Moderate or severe tricuspid regurgitation	0.75
Mechanical valve	4.25
Cyanotic heart disease (corrected or uncorrected)	1
ZAHARA Score	Predicted Risk, %
0-0.5	2.9
0.51-1.50	7.5
1.51-2.50	17.5
2.51-3.50	43.1
>3.50	70.0

NYHA = New York Heart Association; ZAHARA = Zwangerschap bij Angeboren HARTafwijking (Pregnancy in Women With Congenital Heart Disease) study.

**TABLE 3 Modified WHO Risk Stratification Model**

Modified WHO Class	Conditions	Predicted Risk, %
I—No higher risk than the general population	Uncomplicated, small or mild lesions including pulmonary stenosis, VSD, PDA, and mitral valve prolapse with no more than trivial mitral regurgitation	2.5-5
	Successfully repaired simple lesions including ostium secundum ASD, VSD, PDA, and TAPVD Isolated PVCs and PACs	
II—Small increased risk of maternal morbidity and mortality	Unoperated ASD	5.7-10.5
	Repaired tetralogy of Fallot Most arrhythmias Coarctation of the aorta without significant gradient or aneurysm (repaired or unrepaired) Long QT syndrome	
II to III	Mild LV impairment	10-19
	Hypertrophic cardiomyopathy Marfan syndrome without aortic dilation Heart transplant Native or tissue valve disease not considered WHO class IV Bicuspid aortic valve without aortic dilatation	
III—Significant risk of maternal morbidity and mortality	Mechanical valve	19-27
	Systemic RV Post-Fontan operation Cyanotic heart disease Other complex congenital heart repair Aortic dilation without known fibrinogen disease Coarctation of the aorta with residual gradient or aneurysm (repaired or unrepaired) Marfan syndrome with aortic root dilation <45 mm or following aortic replacement Bicuspid aortic valve with aortic root dilation 45 to 50 mm	
IV—Pregnancy contraindicated	Pulmonary arterial hypertension of any cause Severe left ventricular dysfunction (LVEF <30% or NYHA functional class III to IV) Previous peripartum cardiomyopathy with any residual impairment of LV function Severe left heart obstruction (AVA <1 cm <sup>2</sup> or peak gradient >50 mm Hg; MVA <1.5 cm <sup>2</sup> ) Marfan syndrome with aortic dilation >45 mm Bicuspid aortic valve with aortic dilation >50 mm	40-100

# ANESTHESIOLOGY

## Obstetric Anesthesia and Heart Disease: Practical Clinical Considerations

Marie-Louise Meng, M.D., Katherine W. Arendt, M.D.

*ANESTHESIOLOGY* 2021; 135:164–83

### ABSTRACT

Maternal morbidity and mortality as a result of cardiac disease is increasing in the United States. Safe management of pregnancy in women with heart disease requires appropriate anesthetic, cardiac, and obstetric care. The anesthesiologist should risk stratify pregnant patients based upon cardiac disease etiology and severity in order to determine the appropriate type of hospital and location within the hospital for delivery and anesthetic management. Increased intrapartum hemodynamic monitoring may be necessary and neuraxial analgesia and anesthesia is typically appropriate. The anesthesiologist should anticipate obstetric and cardiac emergencies such as emergency cesarean delivery, postpartum hemorrhage, and peripartum arrhythmias. This clinical review answers practical questions for the obstetric anesthesiologist and the nonsubspecialist anesthesiologist who regularly practices obstetric anesthesia.



**Table 1.** Modified World Health Organization Classification of Cardiovascular Disease in Pregnancy<sup>1,2</sup>

Risk Classification	Cardiac Lesions
<p><b>Class I</b> No detectable increased risk of maternal mortality and no or minimal increase in maternal morbidity</p>	<ul style="list-style-type: none"> <li>• Uncomplicated mild pulmonary stenosis</li> <li>• Ventricular septal defect</li> <li>• Patent ductus arteriosus</li> <li>• Mitral valve prolapse with no more than trivial mitral regurgitation</li> <li>• Successfully repaired simple lesions (atrial or ventricular septal defect, patent ductus arteriosus, anomalous pulmonary venous drainage)</li> <li>• Isolated ventricular extra-systoles and atrial ectopic beats</li> </ul>
<p><b>Class II</b> Small increased risk of maternal mortality or moderate increase in morbidity</p> <p><b>Class II–III</b> Moderate increased risk of maternal mortality or morbidity</p>	<ul style="list-style-type: none"> <li>• Unrepaired atrial or ventricular septal defect</li> <li>• Repaired tetralogy of Fallot</li> <li>• Most arrhythmias</li> <li>• Hypertrophic cardiomyopathy</li> <li>• Native or tissue valvular heart disease not considered Modified World Health organization I or IV</li> <li>• Repaired coarctation</li> <li>• Marfan syndrome without aortic dilatation</li> <li>• Bicuspid valve with aorta &lt;45 mm</li> <li>• Mild ventricular impairment</li> </ul>
<p><b>Class III</b> Significantly increased risk of maternal mortality or severe morbidity, and expert cardiac and obstetric prepregnancy, antenatal, and postnatal care are required</p>	<ul style="list-style-type: none"> <li>• Heart transplantation</li> <li>• Mechanical valve</li> <li>• Systemic right ventricle</li> <li>• Fontan circulation</li> <li>• Unrepaired cyanotic heart disease</li> <li>• Other complex congenital heart disease</li> <li>• Marfan syndrome with aorta 40–45 mm</li> <li>• Bicuspid aortic valve with aorta 45–50 mm</li> </ul>
<p><b>Class IV</b> Pregnancy is highly discouraged</p>	<ul style="list-style-type: none"> <li>• Pulmonary hypertension</li> <li>• Eisenmenger syndrome</li> <li>• Systemic ventricular ejection fraction &lt;30%</li> <li>• Systemic ventricular dysfunction with New York Heart Association class III–IV</li> <li>• Severe mitral stenosis or symptomatic aortic stenosis</li> <li>• Marfan syndrome with aorta &gt;45 mm</li> <li>• Bicuspid aortic valve with aorta &gt;50 mm</li> <li>• Native severe coarctation</li> <li>• Previous peripartum cardiomyopathy with any residual impairment of ventricular function</li> </ul>

# Where Should Women with Known Heart Disease Deliver?

**Table 2.** Maternal Levels of Care<sup>3</sup>

Level	Title	Maternal Health	Hospital Capabilities	Anesthesia Staffing	Modified World Health Organization Patients*
Birth center	Birth center	Low risk	Not applicable	None	None
Level I	Basic care	Low to moderate risk	Limited obstetric ultrasound Blood bank	Anesthesia provider readily available at all times	Modified World Health Organization class I
Level II	Specialty care	Moderate to high risk	Computed tomography scanning/magnetic resonance imaging Maternal echocardiogram Nonobstetric ultrasound	Anesthesiologist readily available at all times	Modified World Health Organization class I or II
Level III	Subspecialty care	More complex maternal, obstetric and fetal conditions	Interventional radiology In-house capability of all blood components	Board-certified anesthesiologist physically present at all times	Modified World Health Organization class I or II, some III
Level IV	Regional perinatal health center	Most complex maternal conditions	ICU care with Maternal Fetal Medicine comanagement Cardiovascular surgery, ECMO, and transplant capabilities	Board-certified anesthesiologist with obstetric anesthesia fellowship or experience in obstetric anesthesia physically present at all times	Modified World Health Organization class I, II, III, or IV

\*The addition of the Modified World Health Organization classifications into the Maternal Levels of Care is an extrapolation based upon Drs. Meng and Arendt's experience, and is not a direct recommendation from the American College of Obstetricians and Gynecologists, Society of Maternal–Fetal Medicine, or Modified World Health Organization.

ECMO, extracorporeal membrane oxygenator; ICU, intensive care unit.

## Table 3. Anesthetic Care Steps for Pregnant Women with Known Cardiovascular Disease

### Predelivery Consultation with the Anesthesiology Service

1. Summarize cardiovascular, obstetric, and anesthesia history and risk factors
2. Cardiac history should focus on:
  - a. Previous surgeries, echocardiograms, electrocardiograms, Holter monitors, stress tests, heart catheterization, *etc.*
  - b. Previous or current episodes of heart failure
  - c. Intracardiac shunting and cyanosis
  - d. Previous arrhythmias
  - e. Left heart obstructive lesions
  - f. Left and right heart function
3. Risk stratify according to the Modified World Health Organization criteria
4. Participate in multidisciplinary planning of labor and delivery
5. With obstetric team, plan appropriate delivery location according to maternal levels of care
6. Partner with pregnancy heart team\* for anticoagulation regimen to optimize ability to perform neuraxial techniques
7. Clarify in the consultation note plan for pacemaker or defibrillator (keep automatic implantable cardioverter defibrillator “on” during labor or cesarean delivery)
8. Clarify in the consultation notes which obstetric drugs could cause hemodynamic instability (see table 5)
9. Partner with pregnancy heart team\* to clarify in the consultation notes postdelivery plans for monitoring

**Table 6.** Side Effects of Medications Commonly Used for Obstetric Care

Medication (Class)	Cardiopulmonary Effects	Lesions for Which Medication Is Relatively Contraindicated	Notes
Oxytocin (uterotonic)	↓ SVR and MAP Slight ↑pulmonary vascular resistance and PAP	Most cardiac patients tolerate oxytocin if carefully titrated	Effective uterotonic agent Administer slowly <i>via</i> infusion pump in patients intolerant of ↓ MAP Consider counteracting ↓ MAP with phenylephrine infusion Do not administer in bolus intravenous form in patients with cardiac disease
Misoprostol (uterotonic)	None	None	Least effective uterotonic agent Can be used prophylactically Mechanism similar to an $\alpha$ -adrenergic agent
Methylergonovine (uterotonic)	↑ SVR ↑ Pulmonary vascular resistance	Hypertension Preeclampsia Pulmonary hypertension Ischemic disease Intracardiac shunts Aortopathy Fontan circulation Intracardiac shunt Pulmonary hypertension	Generally avoided in cardiac patients
Carboprost (uterotonic)	↑ PAP Bronchospasm resulting in ventilation perfusion mismatch	Hypertrophic obstructive cardiomyopathy History of tachyarrhythmias	Prostaglandin F <sub>2α</sub> Do not use in patients who cannot tolerate increased PAP
Terbutaline (uterine relaxant)	↑ Heart rate ↑ Myocardial contractility ↓ SVR		$\beta$ -agonist

MAP, mean arterial pressure; PAP, pulmonary artery pressure; SVR, systemic vascular resistance.

## Trial of Labor

1. Besides standard labor monitoring also consider monitoring with:
  - a. Pulse oximetry with a wave form
  - b. Five-lead electrocardiography if at risk for tachyarrhythmia or cardiac ischemia
  - c. Intraarterial blood pressure monitoring if at risk for hemodynamic instability with induction of neuraxial or general anesthesia
2. Initiate neuraxial analgesia early in labor (unless contraindication)
3. Do not use a routine preepidural fluid bolus in patients at risk for pulmonary edema
4. Consider modifying epidural test dose to minimize the risk of high spinal or intravascular epinephrine
5. Monitor for hypotension closely during induction of neuraxial labor analgesia and treat with goal-directed fluids and vasopressors (*e.g.*, phenylephrine, norepinephrine, and ephedrine) to maintain normal blood pressure
6. Readily replace suboptimal epidural catheter
7. Keep epidural block dense enough throughout labor such that it eliminates pain and catecholamine release, facilitates operative vaginal delivery, and can quickly be converted to a surgical block in the event of an obstetric emergency

## Cesarean Delivery

1. Low threshold to monitor with **intraarterial blood pressure**
2. Perform **neuraxial anesthesia** if no contraindications (choose epidural, sequential combined spinal epidural, or single-shot spinal based upon presumed tolerance of sympathectomy)
3. **Titrate vasopressor infusion** (e.g., phenylephrine or norepinephrine) to maintain blood pressure
4. **Titrate oxytocin on an infusion pump**

## Postpartum

1. **Titrate oxytocin on an infusion pump**
2. **Monitor for postpartum hemorrhage and treat rapidly**
3. In most cardiovascular patients, risks of methylergonovine and carboprost may outweigh the benefits of these uterotonic medications (see table 5)
4. **More intense monitoring postpartum** (e.g., five-lead electrocardiographic monitoring, continuous pulse oximetry) may be indicated in patients with Modified World Health Organization class III or IV lesions, or those who experience obstetric or cardiac complications during labor or delivery. This may require intensive care or step-down unit admission.

# ANESTHESIOLOGY

## Obstetric Anesthesia and Heart Disease: Practical Clinical Considerations

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## Conclusions

- ACOG, AHA, SMFM & ESC soulignent le **rôle essentiel de l'anesthésiste dans le « Pregnancy Heart Team »**
- **Obstétricien généralement pas focalisé sur l'optimisation hémodynamique**
- **Cardiologue généralement pas disponible au bloc d'accouchement**
- **L'optimisation hémodynamique des cardiopathies est une activité quotidienne des anesthésistes-réanimateur (moins en OB)**
- **L'anesthésiste joue un rôle central**
  - Analgésie optimale pour le travail et l'accouchement
  - Anesthésie optimale pour la césarienne
  - Prévention des événements cardiaques indésirables
  - Détection précoces des événements critiques
  - Mise en œuvre précoce et optimale d'une réanimation
- **L'anesthésiste peut donc assurer un leadership dans la prise en charge périnatale des parturientes cardiopathes nécessitant une prise en charge pluridisciplinaire.**

# 2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy

**The Task Force for the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC)**

**Endorsed by: the International Society of Gender Medicine (IGM), the German Institute of Gender in Medicine (DGesGM), the European Society of Anaesthesiology (ESA), and the European Society of Gynecology (ESG)**





### 3.8.3 Vaginal or caesarean delivery

The ROPAC data show that elective caesarean section carries no maternal benefit and results in earlier delivery and lower birth weight.<sup>96</sup> Vaginal delivery is associated with less blood loss and lower risk of infection, venous thrombosis, and embolism, and should be advised for most women. Caesarean section should be considered for obstetric indications and for patients presenting in labour on oral anticoagulants (OACs), with aggressive aortic pathology, and in acute intractable HF. Caesarean section is advised in severe forms of PH (including Eisenmenger's syndrome).

### 3.8.7 Anaesthesia/analgesia

Epidural analgesia reduces labour pain and can be used to provide anaesthesia for caesarean section if necessary. However, it can cause systemic hypotension (10%) and must be carefully titrated, especially in patients with obstructive valve lesions or diminished ventricular function who may benefit from invasive BP monitoring. All i.v. fluids need to be used carefully.<sup>101</sup>

### 3.8.8 Labour

Mobilization may facilitate foetal head descent and a lateral decubitus position can attenuate the haemodynamic impact of cava compression by the gravid uterus.<sup>102</sup> The active phase of the second stage should be delayed for 2 h to allow maximal descent of the foetal head, as this will shorten the active phase of the second stage.<sup>103,104</sup>

Assisted delivery with forceps or a ventouse may be used to further reduce maternal effort, as indicated by the underlying cardiac lesion. Continuous electronic foetal heart rate monitoring is recommended.



### 3.8.9 Perimortem caesarean section

In the case of an acute life-threatening maternal event, immediate delivery should be considered. The aim of delivery is to improve the chance of successfully resuscitating the mother and, only secondarily, of improving foetal survival. It should be considered from 24 weeks of gestation, as prior to this time the degree of uterine vena cava compression is limited and the baby is not considered to be viable. The delivery should be performed within 4 min of the cardiac arrest.



## Planned vaginal delivery and cardiovascular morbidity in pregnant women with heart disease



Sarah Rae Easter, MD; Caroline E. Rouse, MD; Valeria Duarte, MD; Jenna S. Hynes, MD; Michael N. Singh, MD; Michael J. Landzberg, MD; Anne Marie Valente, MD; Katherine E. Economy, MD MPH

Brigham and Women's Hospital, Harvard Medical School, **American Journal of Obstetrics & Gynecology** JANUARY 2020

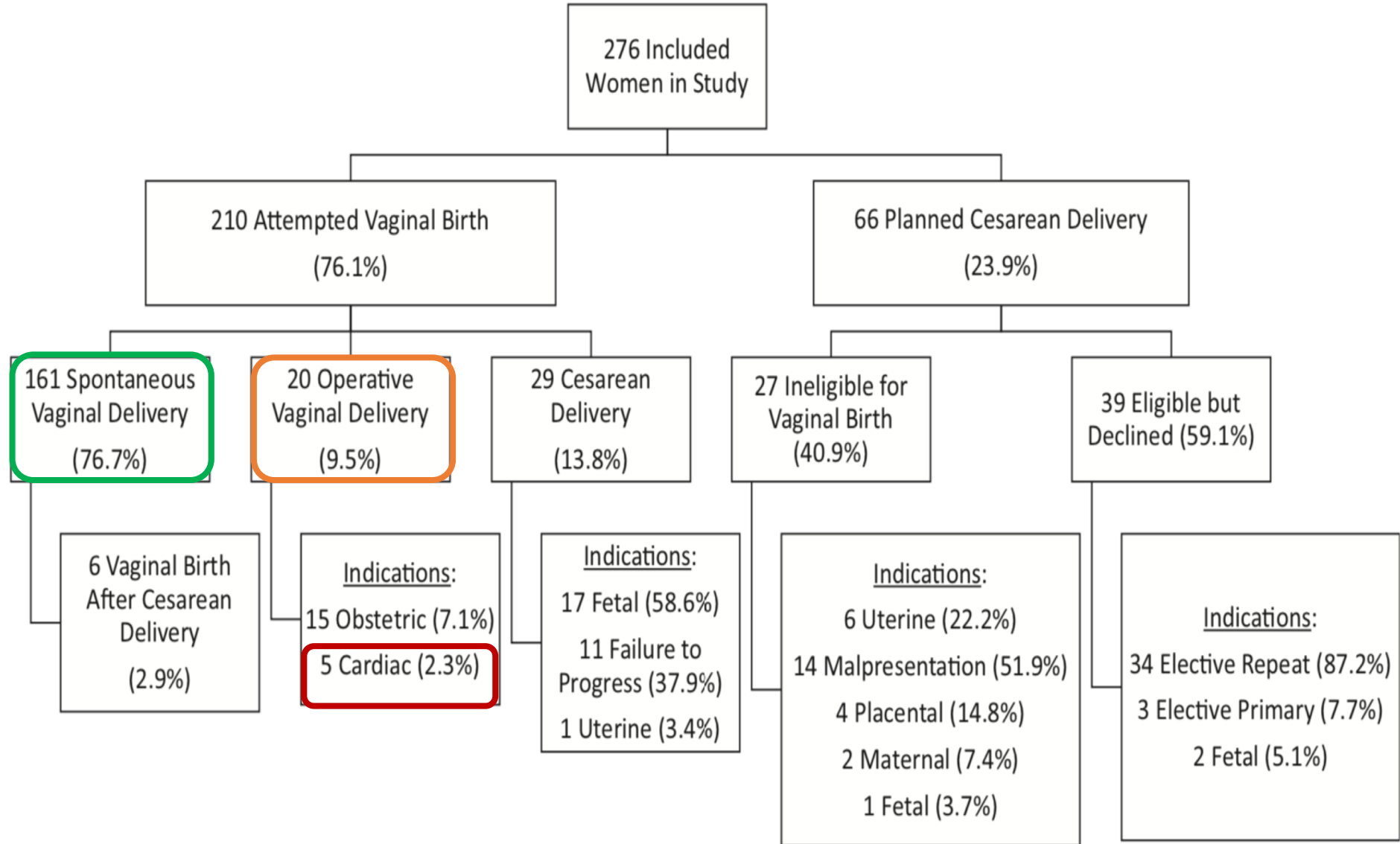
# VB vs CS ?

# Instrumentation vs Valsalva ?

- **Cohorte prospective 276 parturientes « cardiopathes »**
  - Cardiopathies congénitales 68.5%
  - Arythmies 11.2%
  - Anomalies du conjonctif 9.1%
  - Cardiomyopathies 8%
  - Pathologies valvulaires 1.4%
  - Coronaropathies 1.4%
- Centre tertiaire avec **protocole multidisciplinaire de PEC** des parturientes avec cardiopathie
- **VB encouragée** sauf si indication obstétricale de CS
- **Valsalva autorisé** sauf si engendre symptomatologie ou altération hémodynamiques

**FIGURE 2**

**Actual mode of delivery and associated indications**



**TABLE 4**
**Obstetric and cardiovascular outcomes according to planned mode of delivery**

Outcomes	Total (n = 276)	Planned vaginal birth (n = 210)	Planned cesarean delivery (n = 66)	<i>P</i> value <sup>a</sup>
Composite cardiac outcome <sup>b</sup>	11 (4.0)	9 (4.3)	2 (3.0)	1.00
Sustained arrhythmia	1 (0.36)	1 (0.48)	0 (0)	1.00
Heart failure	9 (3.3)	7 (3.3)	2 (3.0)	1.00
Composite obstetric outcome <sup>c</sup>	33 (12.0)	21 (10.0)	11 (18.2)	.08
Postpartum hemorrhage	11 (4.0)	4 (1.9)	7 (10.6)	< .01
Blood transfusion	10 (3.6)	4 (1.9)	6 (9.1)	.01
Estimated blood loss $\geq$ 1500 mL	8 (2.9)	3 (1.4)	5 (7.6)	.02
Hysterectomy	2 (0.72)	1 (0.48)	1 (1.5)	.42
Peripartum infection	24 (8.8)	19 (9.1)	5 (7.6)	.81
Chorioamnionitis	11 (4.0)	11 (5.2)	0 (0)	.07
Endometritis	7 (2.5)	4 (1.9)	3 (4.6)	.36
Wound cellulitis	4 (1.5)	3 (1.4)	1 (1.5)	1.00
Wound reopening	2 (0.72)	1 (0.48)	1 (1.5)	.42
Venous thromboembolism	3 (1.1)	0 (0)	3 (4.6)	.01
Severe maternal morbidity	17 (6.2)	9 (4.3)	8 (12.1)	.04
Maternal ICU admission	3 (1.1)	1 (0.48)	2 (3.0)	.14
NICU admission <sup>d</sup>	5 (2.4)	4 (2.3)	1 (2.4)	1.00
Composite neonatal outcome <sup>d</sup>	0 (0)	0 (0)	0 (0)	1.00

## AJOG at a Glance

### Why was this study conducted?

The study was conducted to compare cardiovascular and obstetric morbidity in women with cardiovascular disease according to plan for vaginal birth or cesarean delivery.

### Key findings

Adverse cardiac outcomes were similar between women planning vaginal birth and those planning cesarean delivery (4.3% vs 3.0%,  $P = 1.00$ ). Rates of postpartum hemorrhage (1.9% vs 10.6%,  $P < .01$ ) and transfusion (1.9% vs 9.1%,  $P = .01$ ) were lower in the planned vaginal birth group. All women tolerated a trial of Valsalva without hemodynamic compromise or adverse cardiac events.

### What does this add to what is known?

This prospective cohort study from a contemporary patient population managed by a multidisciplinary team with a standardized approach to care demonstrates the safety of attempted vaginal birth including a trial of Valsalva for women with cardiac disease in pregnancy.



# Obésité



- **Epidémiologie**
- **Morbi-mortalité**
- **Anesthésie/ Analgésie**
- **Thromboprophylaxie**

# Anesthetic Management of a Super Morbidly Obese Obstetric Patient With a Body Mass Index of **109** kg/m<sup>2</sup> Presenting for Her Fourth Caesarean Delivery



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1. Anesthesiology, Loma Linda University Medical Center, Loma Linda, USA 2. Anesthesiology, Emory University School of Medicine, Loma Linda, USA

**27 ans, G4P3**

**170 cm, 316 kg**

**OSAS + CPAP**

**HTA**

**FA paroxystique (non anticoagulée)**

**Diabète II**

**RGO**

**ATCD 3 CS**

**1 AG**

**2 ALR dont 1 ARCA (8 min CPR)**

**1 seule viste à 12 SA**

**Antepartum: dyspnée**

**Angio-CT impossible**

**38 SA Césarienne / AG**

**Refus ALR**

**Challenge technique**

**Décubitus impossible**

**Durée chirurgie ???**

**Durée 2h30**

**Saignement 1.5 L**

**Postpartum**

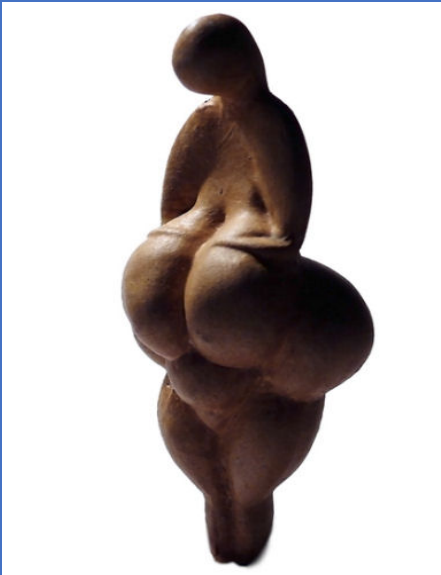
**Hb 7 g/ dl ( < 10) (transfusion)**

**PE sévère**

**suspicion EP, USI , VNI**

**Anticoag probabiliste**

# Définition OMS



	BMI
<b>Normal</b>	<b>18.5 - 24.9</b>
<b>Surpoids</b>	<b>25 - 29.9</b>
<b>Obésité Classe 1</b>	<b>30 - 34.9</b>
<b>Obésité Classe 2</b>	<b>35 - 39.9</b>
<b>Obésité Classe 3</b>	
<b>Obèse Morbide</b>	<b>40 - 49.9</b>
<b>Super Obèse</b>	<b>50 - 59.9</b>
<b>Super Super Obèse</b>	<b>&gt; 60</b>

# Incidence

the main difference between  
**Europe and USA**



prikk:)

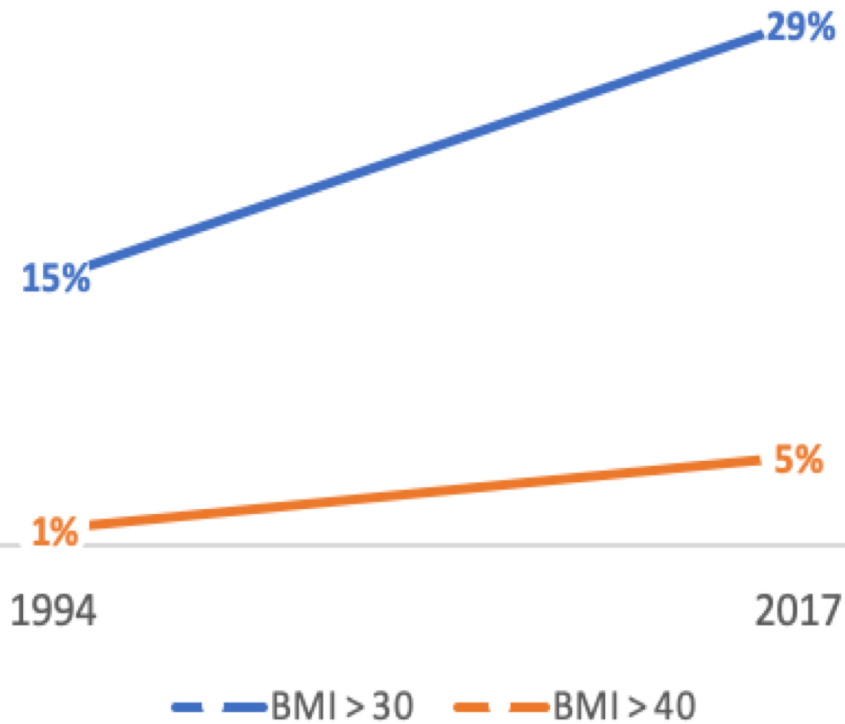




Incidence: UK



### UK: OBESITY (FEMALE)



# Growing Obesity Increases Perils of Childbearing



About two out of three maternal deaths in New York State from 2003 to 2005 were associated with maternal obesity, according to the state-sponsored Safe Motherhood Initiative, which is analyzing more recent data.

Patricia Garcia in a Brooklyn hospital with her son, Josiah, who was born 11 weeks premature.

Jennifer S. Altman for The New York Times

April 2021

Anaesthesia 2021, 76 (Suppl. 4), 108-117

## Review Article

# Obesity in women: anaesthetic implications for peri-operative and peripartum management

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1 Associate Consultant, Department of Women's Anaesthesia, KK Women's and Children's Hospital, Singapore

2 Professor and Chief, Division of Women's Anesthesia, Department of Anesthesiology, Duke University School of Medicine, Durham, NC, USA



# Obésité: Comorbidités

- **Respiratoires**
  - OSA & OHS: 40-90%
  - Risque X4 d'hypoxie
  - Risque HTAP (hypoxie, MTEV)
  - Risque d'intubation difficile
    - BMI > 35: 15%
    - BMI > 40: 33%
- **Cardiovasculaires**
  - HTA: 60%
  - HVG, dysfonction diastolique
  - Coronaropathie: 7%
  - Arythmies
  - MTEV- HTAP (hypoxie) – défaillance VD
- **Gastro-intestinales**
  - HH & RGO
- **Endocriniennes**
  - Diabète



# Obésité: Complications Obstétricales

**Table 2** Odds of obesity-related obstetric complications, compared with non-obese parturients (adapted from [45]).

<b>Obstetric complication</b>		<b>Odds ratio (95%CI)</b>
Fetal macrosomia	★	3.4 (2.8–4.2)
Shoulder dystocia	★	2.9 (1.4–5.8)
Neonatal death		2.6 (1.2–5.8)
Elective caesarean delivery	★	2.4 (2.0–2.9)
Postpartum haemorrhage	★	2.3 (2.1–2.6)
Wound infection		2.2 (1.9–2.6)
Emergency caesarean delivery	★	2.2 (1.8–2.6)
Fetal demise		2.1 (1.5–2.7)
Induction of labour		1.8 (1.5–2.2)
Fetal prematurity		1.2 (1.1–1.4)



# Obésité & Anesthésie



## Anesthesia for the morbidly obese parturient

Eva Roofthoof

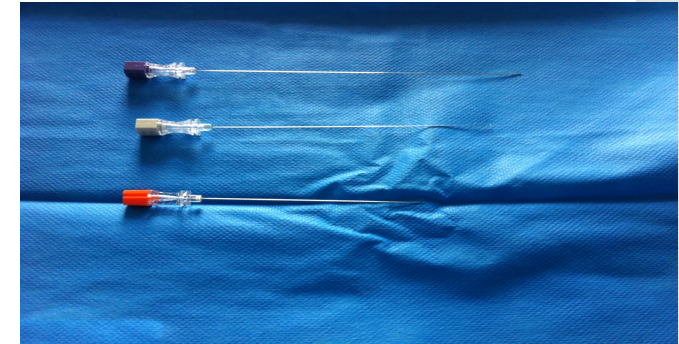
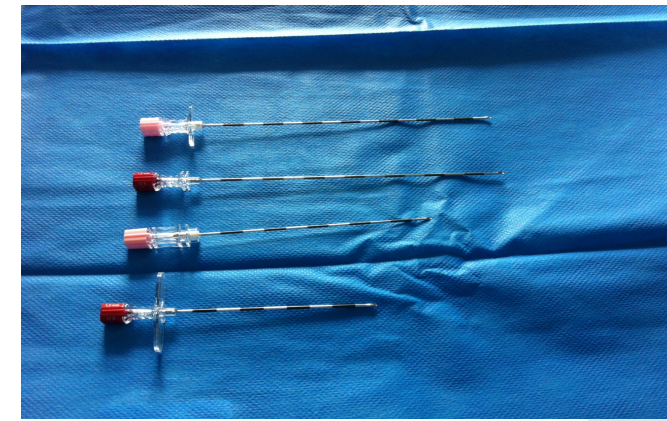
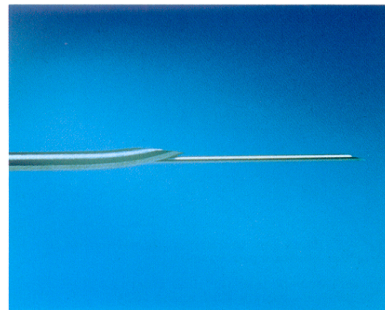
Current Opinion in Anaesthesiology 2009,  
22:341–346

### Summary

Anesthesia-related complications are more frequent in obese parturients. Most authors and opinion leaders agree that regional anesthesia is the preferred technique for Cesarean section in obese patients, and that efforts to place early labor epidural analgesia should be optimized in order to be able to avoid general anesthesia when unplanned Cesarean section is required.

# Obésité & ALR

- Repérage anatomique compliqué
- Espace péridural & sous-arachnoïdien plus profonds
- Matériel adapté
- Repérage échographique
- Procédure svT difficile « chronophage »
  - 75% > 1 tentative
  - 15% > 3 tentatives
- Besoins analgésiques et anesthésiques modifiés
  - Titration
  - Rachi-péridurale combinée (séquentielle)



# Failed tracheal intubation in obstetric anaesthesia: 2 yr national case-control study in the UK

*British Journal of Anaesthesia* 110 (1): 74-80 (2013)



## Obésité & AG

**Table 2** Independent predictors of failed tracheal intubation. Effect sizes are presented as odds ratios with 95% CIs. P-values are estimated using multivariate matched logistic regression

Variable	Odds ratio (95% CI)	P-value
Age (yr)	1.07 (1.01 – 1.14)	0.029
Body mass index (kg m <sup>-2</sup> )	1.06 (1.00 – 1.13)	0.035
Mallampati score recorded	3.06 (1.18 – 7.88)	0.021



Every 1kg /m<sup>2</sup> increase in BMI → ↑ 7% risk Failed intub.



## Anticipation



- **Parturiente obèse = patiente à haut risque**
- **Consultation anesthésie précoce**
  - Comorbidités
  - Bilan cardio-respiratoire: ECG, Echo cardio, SpO2, SAOS
  - Airway
  - Accès veineux
  - Dos
  - **Planification**
    - Analgésie périmédullaire : indication médicale
    - Anesthésie: ALR
    - **Equipement spécial ?**
      - Tensiomètre
      - KT art?
      - Lit ,Brancard, Table d'opération
      - Système de levage: treuil, palan?
      - Aiguilles Tuohy & Rachi





## Anticipation



- **Communication** & partage d'informations entre les spécialités
- **Objectif commun: éviter AG en urgence**
- **Prévenir l'anesthésiste quand patiente obèse (morbide) en travail**
- **Analgésie péridurale précoce**
  - Analgésie
  - Contrôle hémodynamique (HTA-PE)
  - Extraction instrumentale ou césarienne
  - Gestion HPP
  - Evite rachi en urgence (échec)
  - Evite AG en urgence (danger)



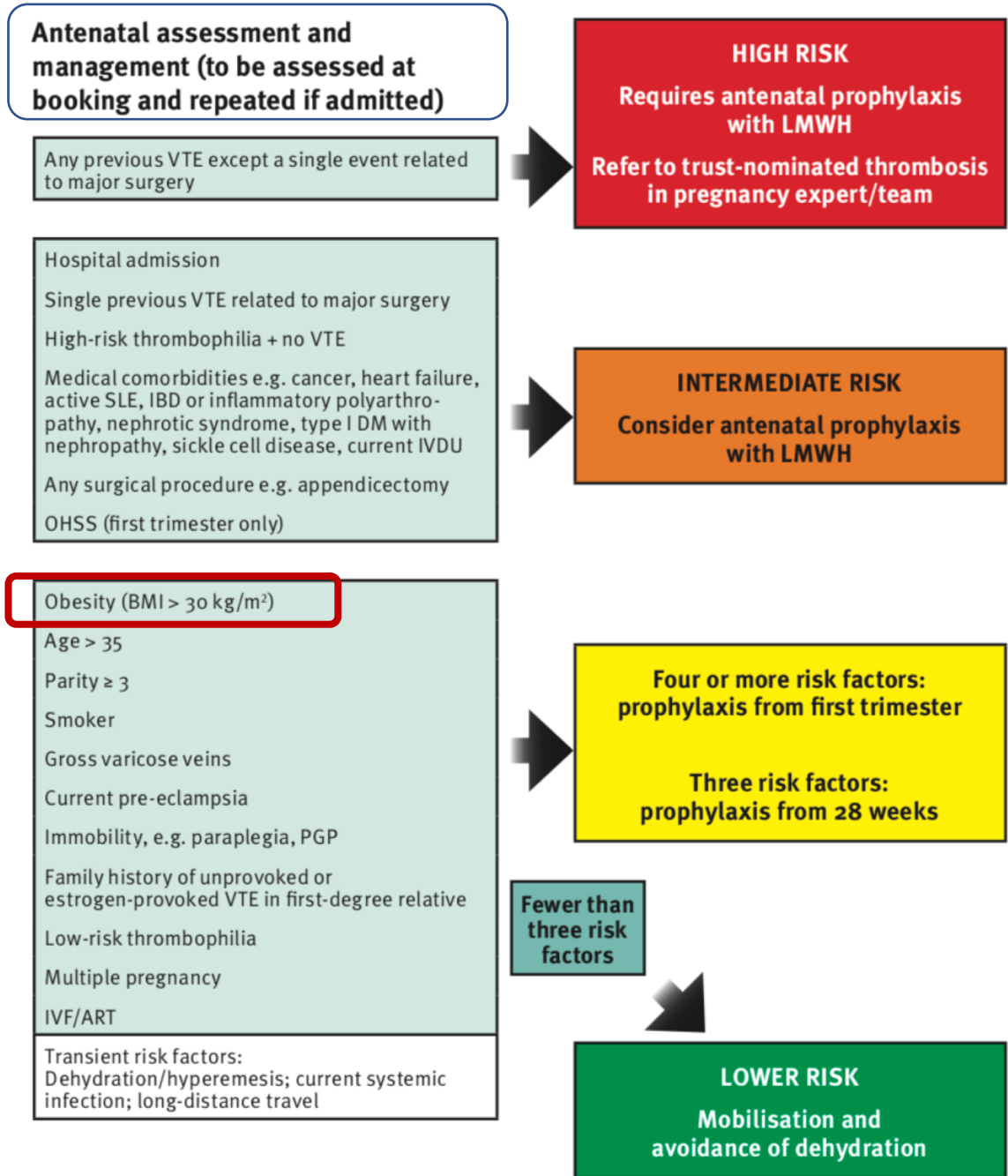
# Obésité & MTEV



Reducing the Risk of  
Venous Thromboembolism during  
Pregnancy and the Puerperium

Green-top Guideline No. 37a  
April 2015

## Appendix I: Obstetric thromboprophylaxis risk assessment and management



# Obésité & MTEV



## Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium

Green-top Guideline No. 37a  
April 2015

### Postnatal assessment and management (to be assessed on delivery suite)

Any previous VTE  
Anyone requiring antenatal LMWH  
High-risk thrombophilia  
Low-risk thrombophilia + FHx

**HIGH RISK**  
At least 6 weeks' postnatal prophylactic LMWH

Caesarean section in labour  
**BMI  $\geq 40$  kg/m<sup>2</sup>**  
Readmission or prolonged admission ( $\geq 3$  days) in the puerperium  
Any surgical procedure in the puerperium except immediate repair of the perineum  
Medical comorbidities e.g. cancer, heart failure, active SLE, IBD or inflammatory polyarthropathy; nephrotic syndrome, type I DM with nephropathy, sickle cell disease, current IVDU

**INTERMEDIATE RISK**  
At least 10 days' postnatal prophylactic LMWH  
NB If persisting or  $> 3$  risk factors consider extending thromboprophylaxis with LMWH

Age  $> 35$  years  
**Obesity (BMI  $\geq 30$  kg/m<sup>2</sup>)**  
Parity  $\geq 3$   
Smoker  
Elective caesarean section  
Family history of VTE  
Low-risk thrombophilia  
Gross varicose veins  
Current systemic infection  
Immobility, e.g. paraplegia, PGP, long-distance travel  
Current pre-eclampsia  
Multiple pregnancy  
Preterm delivery in this pregnancy ( $< 37^{\circ}$  weeks)  
Stillbirth in this pregnancy  
Mid-cavity rotational or operative delivery  
Prolonged labour ( $> 24$  hours)  
PPH  $> 1$  litre or blood transfusion

Two or more risk factors

Fewer than two risk factors

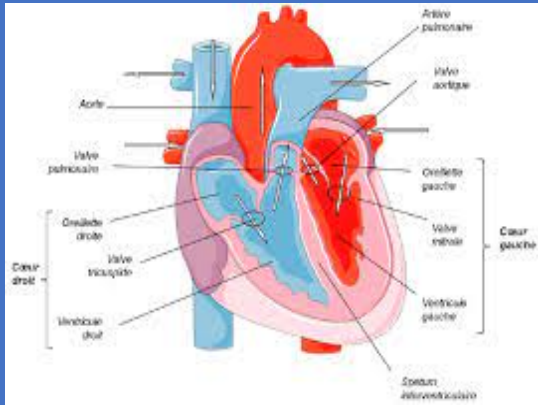
**LOWER RISK**  
Early mobilisation and avoidance of dehydration



## Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium

Green-top Guideline No. 37a  
April 2015

Thromboprophylaxie	Enoxaparine (Clexane) : dose sc
< 50 kg	20 mg x 1
50-90 kg	40 mg x 1
91-130 kg	60 mg x 1
131-170 kg	80 mg X1 ou 40 mg X2
>170 kg	0.6 mg/kg/ j (en 2 doses)



## Take Home Message



- L'association Grossesse + cardiopathie est de moins en moins rare
- L'anesthésiste joue un rôle central dans le « pregnancy heart team »
- Importance primordiale d'une consultation précoce
- Stratification du risque
- Niveau de soins maternels
- Planification des modalités d'accouchement et d'anesthésie/ analgesie
  - **Indication médicale de péridurale précoce**
  - VB instrumentée (?)
- Sélection, éviction, titration de certaines drogues (utérotoniques)
- Planification des modalités de surveillance du postpartum
- Anticipations des complications
  - CS urgente
  - HPP
  - Arythmies





## Take Home Message



- La proportion de patientes obèses (morbides) est en constante augmentation.
- L'obésité s'accompagne d'une sur-mortalité et morbidité maternelle.
- L'anesthésiste doit être intégré précocement dans le parcours de soins d'une obèse morbide
- **L'obésité morbide est une indication médicale de péridurale précoce au cours du travail**
- L'obèse morbide nécessite une prise en charge pro-active et anticipative pour éviter **le pire scénario: la césarienne urgente sous AG;**
- La communication entre les GYN-OB, les SF et les AR est primordiale dans la prise en charge de ces patientes
- Le postpartum doit aussi être géré de façon pluridisciplinaire
- Une attention particulière doit être portée à la thrombo-prophylaxie chez ces patientes

Merci



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