Sommeil ET Grossesse

Sleep disorders AND Pregnancy

SOMNIO FORUM

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7 décembre 2018

No conflict of interest

Why is it important to talk about pregnancy and sleep ?

- Sleep difficulties are often ignored during pregnancy

- Pregnant women don't talk about sleep problems
  and especially
- Dont complain to their doctors or midwives
- Bad answer : « It's normal »
- And their Doctors do not ask about sleep problems during the consultation

- The consequences of sleep problems during pregnancy are beginning to be much better understood
- Increased litterature reports the last 2 years

- The aim of this presentation is just to inform and alert you

Why is it important to talk about pregnancy and sleep ?

- **Normal sleep in pregnancy**
- **OSAS**
- Insomnia
- RLS

Normal Sleep in Pregnancy

Sleep Variations

- Duration
  - ↗ in the 1st trimester
  - Returns to prepartum sleep duration in the 2nd trimester
  - ↘ in the 3rd trimester

- Quality
  - ↘ throughout pregnancy
  - 72 % of women describe nocturnal arousal
  - Marked during the 3rd trimester

- Sleep architecture
  - ↘ in sleep efficiency
  - Due to nocturnal arousals and micro-arousals (GOR, RLS…)
  - ↘ in slow wave sleep : sleep is perceived as less restorative

Sleep parameter	PSG score
TST (min)	334.7 ± 49.7
SE (%)	76.7 ± 10.0
WASO (min)	77.7 ± 37.9
SOL (min)	23.6 ± 19.4

Sleep duration and efficiency at a mean of 32 weeks - Zhu 2018

Modifications in sleep by trimester

- 1st trimester
  - Increase in daytime sleepiness : naps are often necessary
  - Nausea and vomiting
  - Nycturia
- 2nd trimester
  - Nasal congestion and rhinitis
  - Snoring
  - Arousals linked to foetal movement
- 3rd trimester
  - Sleep is perturbed by pregnancy related symptoms (pain, GOR…)
  - Development of OSA
  - Restless legs
  - Important decrease in total sleep time

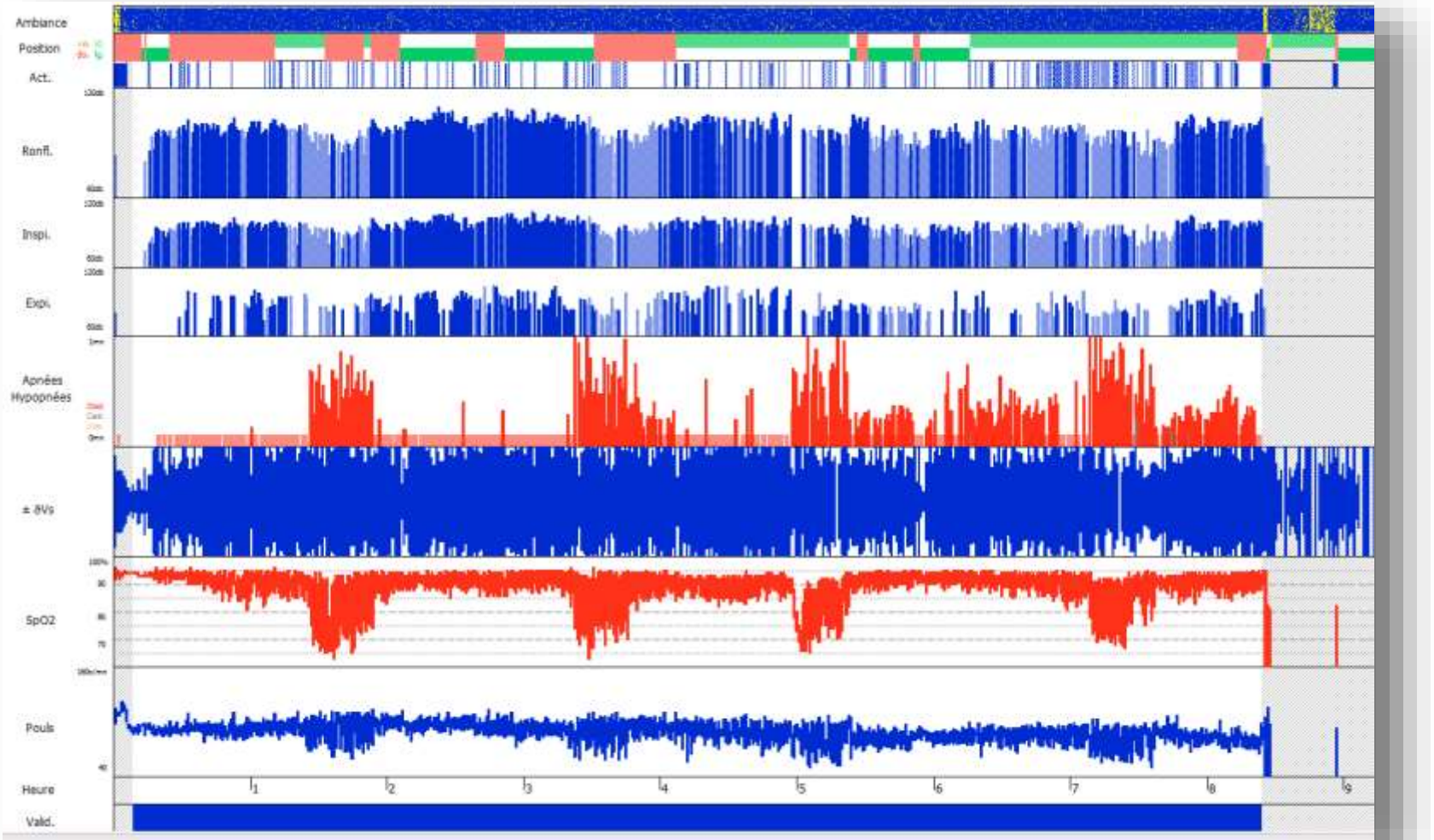
Effect of sleep duration

- < 7 hours of sleep
  - Increase in the risk of gestational diabetes
- < 6 h of sleep
  - Ante-natal depression, especially if snoring is also present
- < 5 h of sleep
  - Increased risk of gestational hypertension during the 3rd trimester
  - Increased risk of pre-eclampsia
- Short time sleep
  - Increase in premature births
  - Increase in delivery time
  - Increase in the risk of caesarian section

Napping in pregnancy

- Essential for compensating for reduced sleep duration and quality
- Often longer than normal, compensate for reduced sleep time
- But attention should be paid to duration in order not to reduce homeostatic pressure too far and reduce nocturnal sleep quality

Be aware of sleep apnea


Ambiance
Position
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Inspi.
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Apnées
Hypopnées
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SpO2
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- Sleep apnea is considered by the general public to be a disease of the obese and for the ENT also retrognathia

- Pregnant women do not consider themselves to be at risk

- Important role
  - for obstetricians and midwives in screening for sleep apnea
  - Importance of the husband's bed report

- In Pien's study in 2014

  - prevalence of OSA of 10.5% (1st trimester) increasing to 26.7% in the 3rd trimester.
  - OSA was defined as an AHI >5.
  - Improvement in AHI was noted in the post partum.

OSA's differents mecanisms

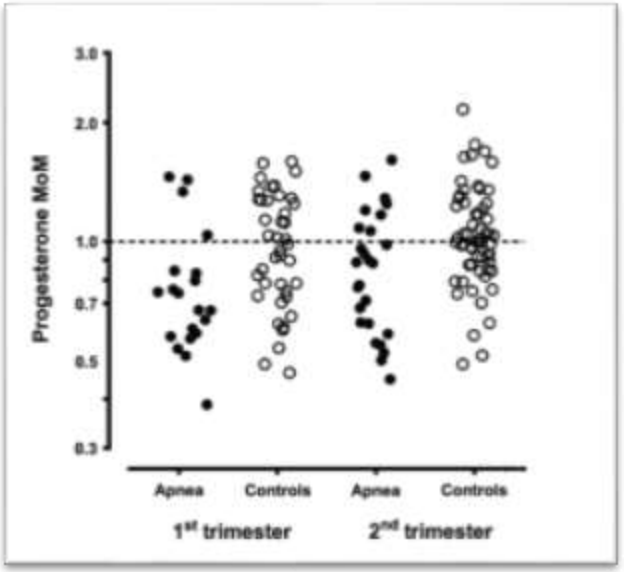
- Physiological modifications increase the risk of OSA in pregnant women :
  - Weight gain
  - Pharyngeal oedema and nasal congestion (estrogen)
  - mass effect of the gravid uterus :
    - Shortened trachea
    - Reduction of pulmonary volume and elevating diaphragm

Mechanisms

- The mouth breathing is increased by
  - The nasal congestion
  - sleeping on the back.
- OSA may be increased by elevated legs which participate to fluid shift
- Effects of progesterone on pharyngeal dilator muscles
- Other hormonal variations

Role of Hormones

- Progesterone :
  - **Stimulates** respiration via an augmentation of the respiratory rate
  - **Protects** against OSA
  - Progesterone level are lower on pregnant women with OSA compare to non OSA pregnant women
- Estrogen :
  - Increases during pregnancy
  - **Decreases the airway caliber** by increase of the resistances

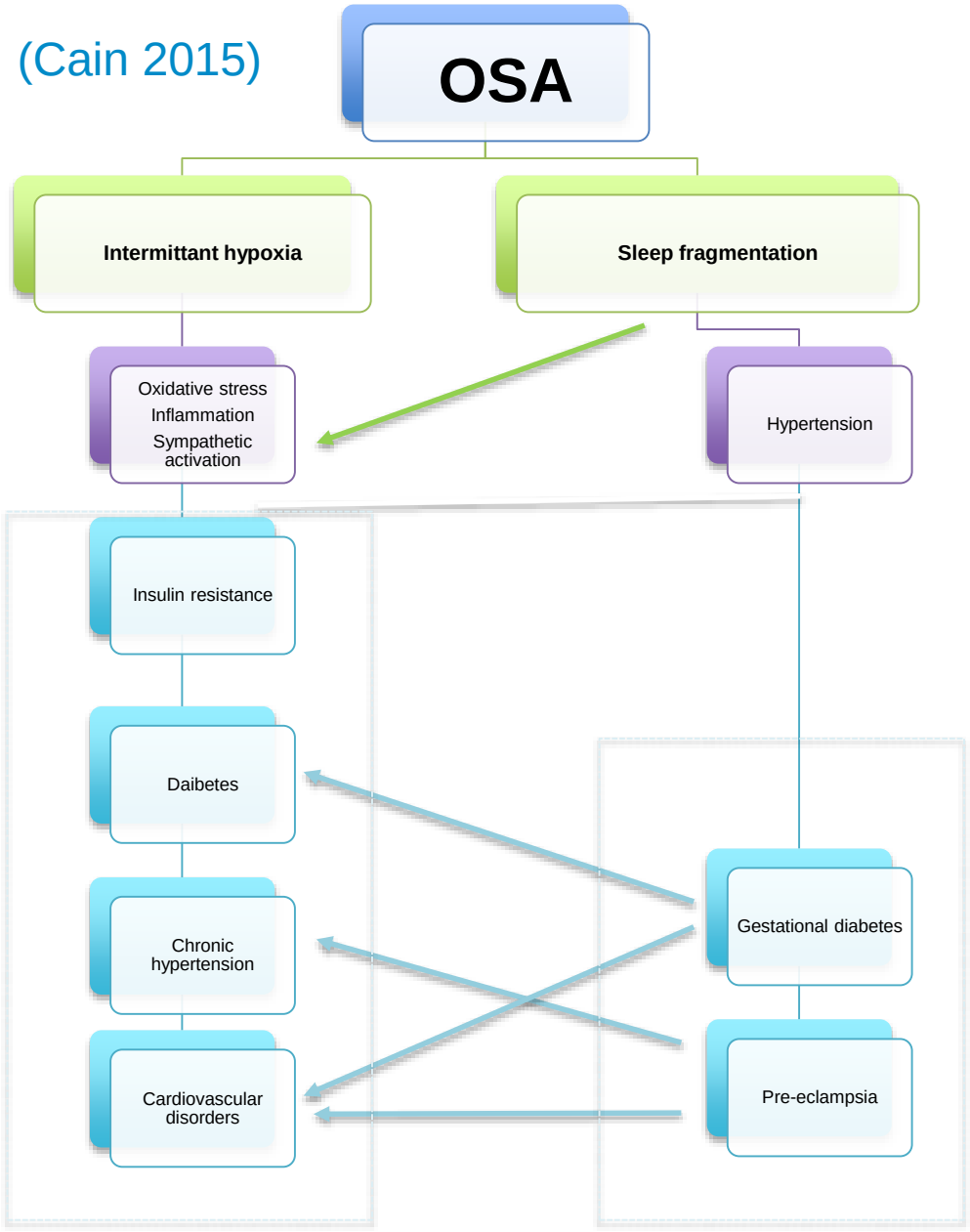


Progesterone levels corrected for height and age: reduction in patients with OSA in first and second trimester (Lee 2017)

Consequences of OSA (Cain 2015)

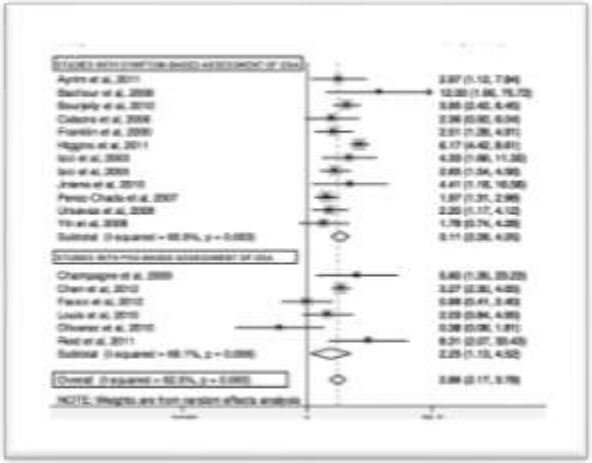
- Daytime sleepiness
- Irritability
- Depression
- Metabolic disorders
- Cardiovascular disorders

- Increased risk of:
  - hypertension: (aOR 1.86 -1.89)
  - gestational hypertension (OR 1.86)
  - maternal mortality (aOR 5.28)
  - Increased risk of pre-eclampsia in OSA (OR 3.55)
  - increased in obesity



Consequences of OSA: pre-eclampsia

- Pre-eclampsia complicates 2-5% of pregnancies.
- Risk factors for preeclampsia : family history, primiparity, age, hypercoagulable state, obesity, pre-existing hypertension, diabetes, and residence at high altitude (Bolivie)
- Pre-eclampsia and OSA share common risk factors



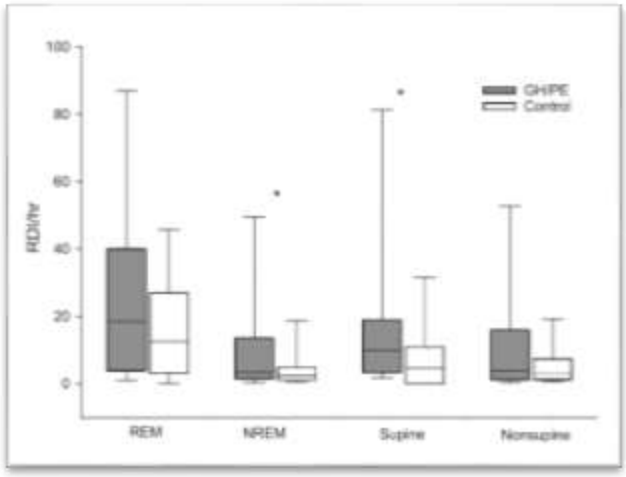
Forest plot of OR for gestational hypertension (Pamidi 2014)

Table 2 RDI categories for GH and PE cases with matched controls

n *(%)*	*Cases* (n = *40)*	*Controls* (n = *40)*	P-*value*
RDI ≥ 5	21 (52.5%)	15 (37.5%)	0.18
RDI ≥ 10	14 (35.0%)	6 (15.0%)	0.039
RDI ≥ 15	9 (22.5%)	5 (12.5%)	0.24
RDI ≥ 30	6 (15.0%)	3 (7.5%)	0.29

RDI, respiratory disturbance index.

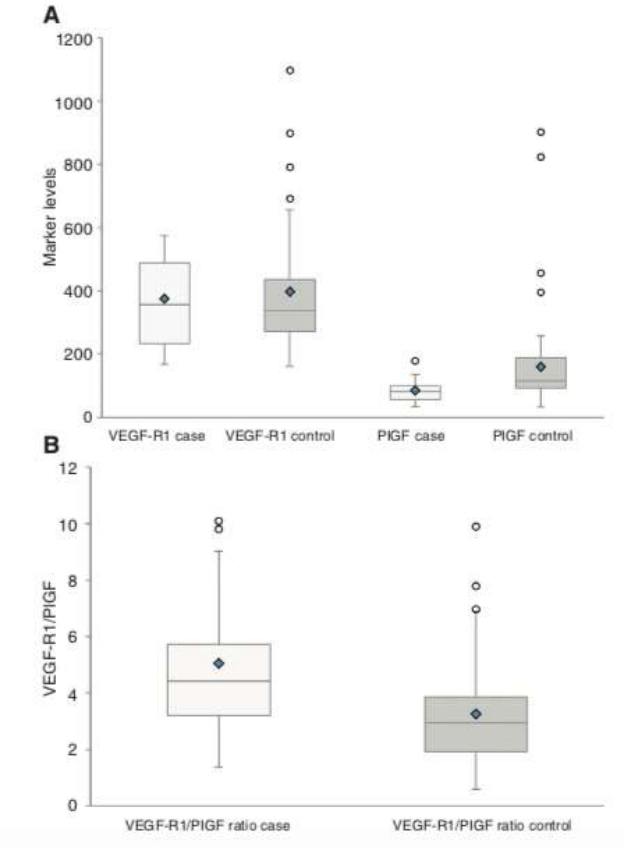
RDI and gestational hypertension vs controls (Wilson 2018) 35% vs 15% have an IAH >10



(Wilson 2018)

Consequences of OSA: pre-eclampsia

- Intermittant hypoxia is associated with
  - the secretion of angiogenic inhibitors, SFlt-1 and sEng and
  - a decrease in vasodilators VEGF, PlGF and TGF-beta
  - Alteration in the angiogenic balance
  - Good predictor of preeclampsia in the OSA group
- These changes are reported in patients with pre-eclampsia AND in pregnant patients with OSA
- Is the common link placental hypoxia?
- Increase of the inflammatory cytokine : TNF, IL6, CRP



Consequences of OSA and CPAP on the foetus

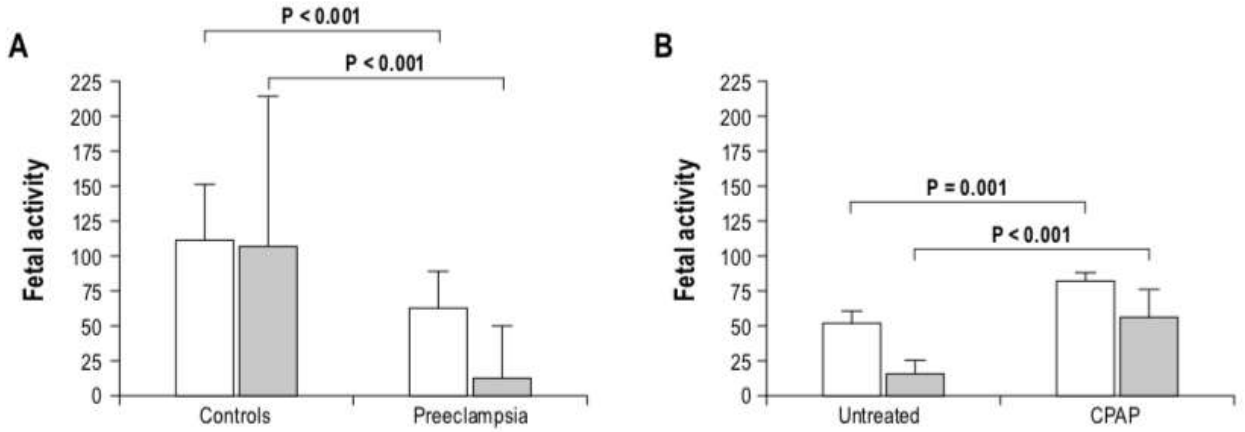


Figure 1—Fetal activity is **(A)** reduced during maternal NREM sleep in preeclampsia, which **(B)** can be partially reversed by nasal CPAP. Fetal activity data are mean (SD) for fetal movements per hour (white bars) and total fetal hiccups (gray bars).

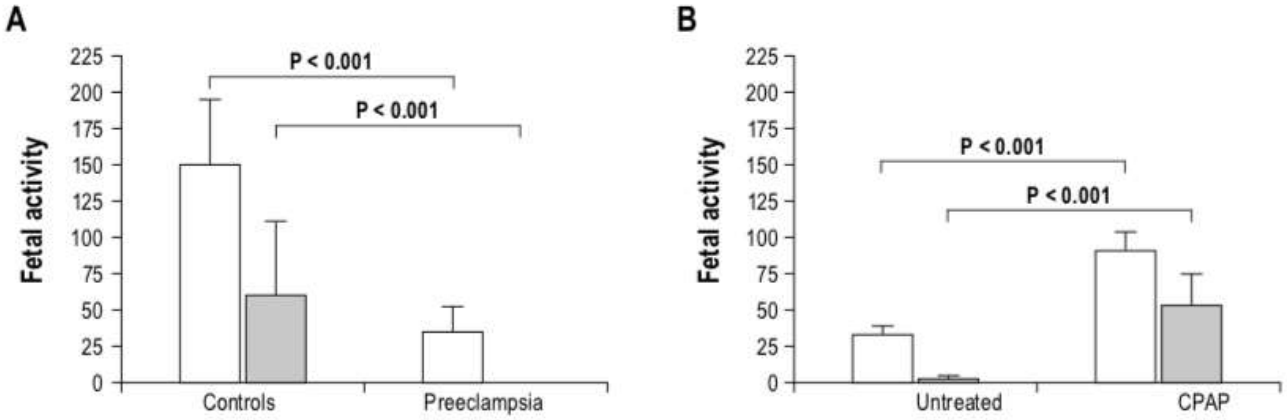


Figure 2—Fetal activity is **(A)** reduced during maternal REM sleep in preeclampsia, which **(B)** can be partially reversed by nasal CPAP. Fetal activity data are mean (SD) for fetal movements per hour (white bars) and total fetal hiccups (gray bars).

Consequences of OSA on the foetus

The interpretation of the results of studies on foetal consequences is complicated :

- Measuring birthweight is complicated
  - by premature births
  - Maternal obesity leads to macrosomia and is also associated with OSA.

➢ The better indicator : the foetal growth during the 3rd trimester.

- Latest studies (Fung 2013, Spence 2017) show reduction in foetal growth during the 3rd trimester in OSA, possibly linked to decelerations of foetal heartbeat observed during intermittant hypoxia
- Some outcomes are rare (stillbirth)

Consequences of OSA on the fœtal growth

Table 2 Fetal growth

	No-OSA ($n = 48$)	OSA ($n = 31$)	PAP ($n = 14$)
Birth weight <10th centile (%)	12 (25%)	7 (23%)	2 (14%)
Fall in growth centile >33% (%)	14 (29%)[a]	19 (61%)[b]	2 (14%)
Impaired fetal growth (%) (either birth weight <10th centile OR a fall in growth centile >33%)	17 (35%)	19 (61%)[c]	4 (29%)

OSA obstructive sleep apnea, *PAP* positive airway pressure

[a] $p = 0.0095$ OSA vs. non-OSA

[b] $p = 0.004$ OSA vs. PAP

[c] $p = 0.09$ OSA vs. PAP

Table 3 Odds ratio for impaired fetal growth

	Impaired fetal growth (either birth weight <10th centile OR a fall in growth centile >33%)	
	Unadjusted OR (95%CI)	Adjusted* OR (95%CI)
No OSA	Reference	Reference
OSA	2.9 (1.1–7.3)	3.4 (1.2–9.9)
PAP	0.7 (0.2–7.0)	0.7 (0.1–3.7)
	Fall in growth centile >33% only	
	Unadjusted OR (95%CI)	Adjusted* OR (95%CI)
No OSA	Reference	Reference
OSA	3.6 (1.4–9.4)	4.3 (1.3–12.8)
PAP	0.4 (0.1–1.9)	0.4 (0.1–2.5)

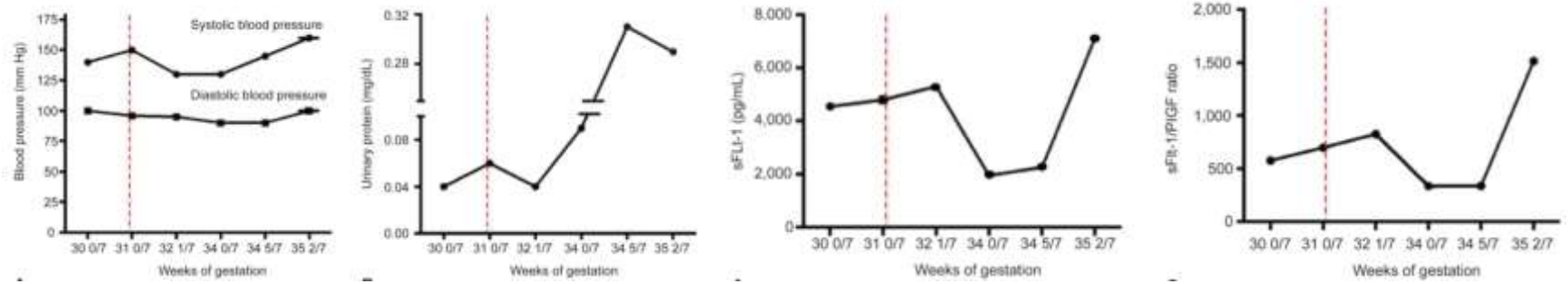
OSA obstructive sleep apnea, *PAP* positive Aairway pressure

*adjusted for maternal age, BMI at the time of sleep study, smoking, chronic hypertension, preeclampsia at enrollment, Type II diabetes mellitus, gestational diabetes, anti-hypertensive medication use, and diabetic medication use

The PAP therapy could potentially minimize the negative impact to fetal growth

CPAP treatment

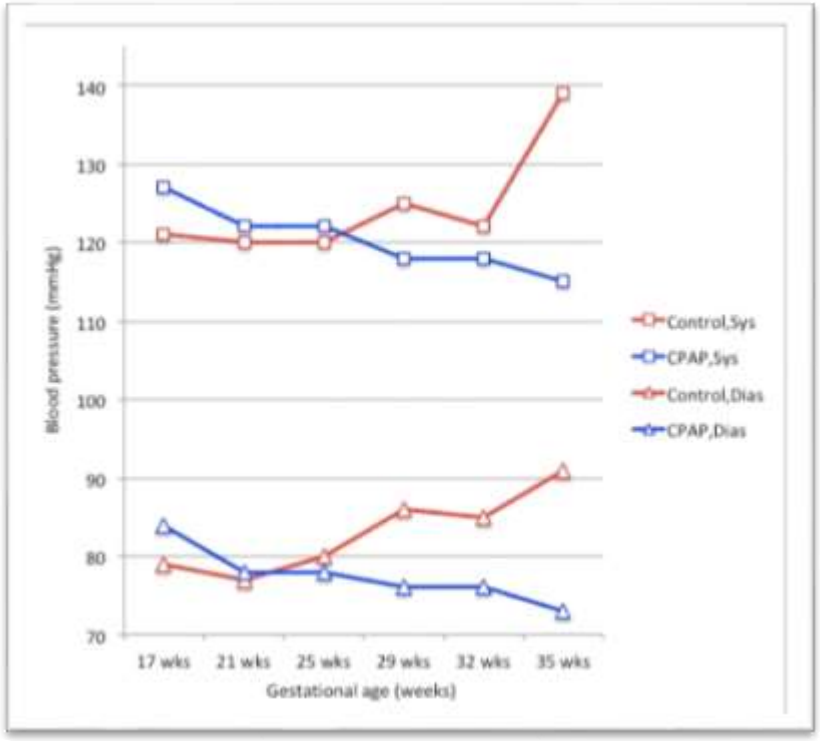
- ✓ Whitehead 2015:
  - ✓ CPAP in a 29 week patients with OSA (AHI 149) and pre-eclampsia. Treated by CPAP (S9, pressures 14 cm H20, adherence 6h07/ night)
  - ✓ Normalization of blood pressure and pre-eclampsia markers up to 34WA
- ✓ Controlled study in hypertensive and snoring women: improvement in blood pressure and reduction in hypertensive treatment.
- ✓ Study of OSA treated by CPAP vs controls : reduced slowing of growth in the 3rd trimester (aOR 3.6)



Whitehead 2015,Kneitel 2018

CPAP settings

- No consensus
- Few studies in pregnant women with autoCPAP with good tolerance
- By security : fixed pressure at the start and CPAP test during a nap period with blood pressure and foetal monitoring (6mmhg)
- Regular evaluation : role of telemonitoring
- Humidifier if dry mouth



Effect of CPAP on blood pressure (Truong 2018 using data from Wolff 2016)

Post-partum

- Control after 3/4 months (PG or PSG)
- Sometimes the gravidic hypertension reveals an OSA problem unknown before pregnancy
- Sometimes OSA disappears
- Inform the woman and obstetrician to follow the sleep during the next pregnancy
- **Monitoring for women with a medical history of HTA or preeclampsia during the next pregnancy**

KEY TAKE-HOME MESSAGES

- In the presence of gestational hypertension, diabetes and pre-eclampsia

  - look for OSA

- In the presence of OSA

  - look for gestational hypertension, diabetes and pre-eclampsia

- And don’t forget the high incidence of :

  - insomnia
  - RLS

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BRIEF REPORTS

Obstructive Sleep Apnea in Pregnancy

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EW RESEARCH

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Can Gestational Hypertension Be Modified By Treating Nocturnal Airflow Limitation?

John Reid, M.D., F.A.A.S.M.; Regina Taylor-Gjevre, M.D., M.Sc.; John Gjevre, M.D., M.Sc.; Robert Skomro, M.D., F.A.A.S.M.; Mark Fenton, M.D.; Femi Olatunbosun, M.D.; John R. Gordon, Ph.D.; David Cotton, M.D.

University of Saskatchewan, Saskatoon, SK Canada

GESTATIONAL HYPERTENSION AND SLEEP DISORDERED BREATHING

Pregnant Women with Gestational Hypertension May Have a High Frequency of Sleep Disordered Breathing

John Reid, MD[1]; Robert Skomro, MD[1]; David Cotton, MD[1]; Heather Ward, MD, MSc[1]; Femi Olatunbosun, MD[1]; John Gjevre, MD[1]; Christian Guilleminault, MD[2]

[1]*University of Saskatchewan, Saskatoon, SK, Canada;* [2]*Stanford University, Palo Alto, CA*

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Published online 2014 September 5. **Review Article**

Restless Leg Syndrome: A Neglected Diagnosis

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[2]Health Research Center, Baqiyatallah University of Medical Sciences, Tehran, IR Iran

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RESEARCH www.AJOG.org

OBSTETRICS

Pregnancy-onset habitual snoring, gestational hypertension, and preeclampsia: prospective cohort study

Louise M. O'Brien, PhD, MS; Alexandra S. Bullough, MBChB, FRCA; Jocelynn T. Owusu, MPH; Kimberley A. Tremblay, MS; Cynthia A. Brincat, MD, PhD; Mark C. Chames, MD; John D. Kalbfleisch, PhD; Ronald D. Chervin, MD, MS

Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health 3 (2013) 133–139

Contents lists available at SciVerse ScienceDirect

Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health

journal homepage: www.elsevier.com/locate/preghy

Original Article

Preeclampsia and sleep-disordered breathing: A case-control study

Francesca L. Facco [a,*], Justin Lappen [b], Courtney Lim [c], Phyllis C. Zee [d], William A. Grobman [e]

PEDIATRIC RESEARCH

Intrauterine Growth Restriction, Preeclampsia, and Intrauterine Mortality at High Altitude in Bolivia

LINDA E. KEYES, J. FERNANDO ARMAZA, SUSAN NIERMEYER, ENRIQUE VARGAS, DAVID A. YOUNG, AND LORNA G. MOORE

Dr N.Aisenberg

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Ghada Bourjeily*, Patrizia Curran, Kristen Butterfield, Hasina Maredia, Marshall Carpenter and Geralyn Lambert-Messerlian

Placenta-secreted circulating markers in pregnant women with obstructive sleep apnea

JOURNAL OF WOMEN'S HEALTH
Volume 26, Number 3, 2017
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DOI: 10.1089/jwh.2016.5917

Original Article

Serum Progesterone Levels in Pregnant Women with Obstructive Sleep Apnea: A Case Control Study

Jennifer Lee, BS,[1] Elizabeth E. Eklund, MS,[2] Geralyn Lambert-Messerlian, PhD,[1,2] Glenn E. Palomaki, MD,[1,2] Kristen Butterfield, MPH,[2] Patrizia Curran, MD,[4] and Ghada Bourjeily, MD[1,4,5]

TREATMENT OF SDB REVERSES LOW FETAL ACTIVITY LEVELS IN PREECLAMPSIA

http://dx.doi.org/10.5665/sleep.2282

Treatment of Sleep Disordered Breathing Reverses Low Fetal Activity Levels in Preeclampsia

Diane M. Blyton, PhD[1]; Michael R. Skilton, PhD[2]; Natalie Edwards, PhD[1*]; Annemarie Hennessy, PhD[3]; David S. Celermajer, PhD[1]; Colin E. Sullivan, PhD[1]

[1]Discipline of Medicine, [2]Boden Institute of Obesity, Nutrition, Exercise and Eating Disorders, University of Sydney, Australia; [3]School of Medicine, University of Western Sydney, Australia

Effects of Maternal Obstructive Sleep Apnoea on Fetal Growth: A Prospective Cohort Study

Alison M. Fung[1], Danielle L. Wilson[3], Martha Lappas[2], Mark Howard[3,4], Maree Barnes[3,4], Fergal O'Donoghue[3,4], Stephen Tong[2], Helen Esdale[1], Gabrielle Fleming[2], Susan P. Walker[1,2*]

Journal of Perinatology
https://doi.org/10.1038/s41372-018-0127-6

ARTICLE

Effects of maternal obstructive sleep apnea on fetal growth: a case-control study

Anna W. Kneitel[1] · Marjorie C. Treadwell[1] · Louise M. O'Brien[1,2]

Received: 14 October 2017 / Revised: 1 April 2018 / Accepted: 12 April 2018

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Kathleen M. Antony, M.D.[1], Alpna Agrawal, Ph.D.[2], Melanie E. Arndt, B.S.[1], Adrienne M. Murphy, B.S.[1], Philip M. Alapat, M.D.[3], Kalpalatha K. Guntupalli, M.D.[3], and Kjersti M. Aagaard, M.D. Ph.D.[1]

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J Sleep Res. (2013) 22, 670–678

Sleep-disordered breathing in pregnancy

Can we predict sleep-disordered breathing in pregnancy? The clinical utility of symptoms

DANIELLE L. WILSON[1], SUSAN P. WALKER[2,3], ALISON M. FUNG[2], FERGAL O'DONOGHUE[1,4], MAREE BARNES[1,4] and MARK HOWARD[1,4]

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Preeclampsia and Sleep-Disordered Breathing: A Case-Control Study

Francesca L. Facco, MD[1], Justin Lappen, MD[2], Courtney Lim, MD[3], Phyllis C. Zee, MD, PhD[4], and William A. Grobman, MD, MBA[5]

Sleep Medicine Reviews xxx (2014) 1–14

Contents lists available at ScienceDirect

Sleep Medicine Reviews

journal homepage: www.elsevier.com/locate/smrv

CLINICAL REVIEW

Consensus clinical practice guidelines for the diagnosis and treatment of restless legs syndrome/Willis-Ekbom disease during pregnancy and lactation

Daniel L. Picchietti [a,*], Jennifer G. Hensley [b], Jacquelyn L. Bainbridge [c], Kathryn A. Lee [d], Mauro Manconi [e], James A. McGregor [f], Robert M. Silver [g], Claudia Trenkwalder [h,i], Arthur S. Walters [j], On behalf of the International Restless Legs Syndrome Study Group (IRLSSG)

e-ISSN 1643-3750
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Poor Sleep Quality of Third-Trimester Pregnancy is a Risk Factor for Postpartum Depression

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BMC Pregnancy & Childbirth

RESEARCH ARTICLE Open Access

Habitual snoring and depressive symptoms during pregnancy

Louise M O'Brien[1,2*], Jocelynn T Owusu[1] and Leslie M Swanson[3]

Published in final edited form as:
Clin Obstet Gynecol. 2013 June ; 56(2): 360–371. doi:10.1097/GRF.0b013e31828f2717.

Diagnostic and Management Approach to Common Sleep Disorders During Pregnancy

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University of Utah, Department of Neurology, Division of Sleep and Movement Disorders

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Expert Review of Respiratory Medicine

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Sleep disordered breathing in pregnant women: maternal and fetal risk, treatment considerations, and future perspectives

Kimberly Truong & Christian Guilleminault

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Mild Maternal Obstructive Sleep Apnea in Non-obese Pregnant Women and Accelerated Fetal Growth

Ayana Telerant[1,3], Galit Levi Dunietz[3,4], Ariel Many[2,3] & Riva Tauman[1,3]

Sleep Disorders in Pregnancy

Implications, Evaluation, and Treatment

Sally Ibrahim, MD[a,*], Nancy Foldvary-Schaefer, DO, MS[b]

KEYWORDS

- Pregnancy • Sleep • Restless legs syndrome • Insomnia • Obstructive sleep apnea
- Maternal-fetal health

KEY POINTS

- Sleep problems in pregnancy are common and may affect pregnancy.
- Restless legs syndrome is very common during pregnancy and is easily diagnosed with 4 clinical criteria.
- Shorter sleep duration in pregnancy is associated with increased morbidity, such as gestational diabetes and preeclampsia.
- Snoring and obstructive sleep apnea (OSA) are associated with increased risk of gestational diabetes, preeclampsia, and pregnancy-induced hypertension.

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Thanks for your attention

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AFSORL Association Française du Sommeil en ORL

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