Sleep disorders AND Pregnancy
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.
- Don’t 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 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
• 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 different mechanisms

- 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)

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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

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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
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, PI GF 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 intermittent hypoxia
- Some outcomes are rare (stillbirth)
Consequences of OSA on the foetal growth

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)
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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Mark Fenton, M.D.; Farni Clutunbasun, M.D.; John R. Gordon, Ph.D.; David Cotton, M.D.
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Restless Leg Syndrome: A Neglected Diagnosis
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Preeclampsia and sleep-disordered breathing: A case-control study
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Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health
Original Article
Intrauterine Growth Restriction, Preeclampsia, and Intrauterine Mortality at High Altitude in Bolivia
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Effects of Maternal Obstructive Sleep Apnoea on Fetal Growth: A Prospective Cohort Study

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Association of Adverse Perinatal Outcomes with Screening Measures of Obstructive Sleep Apnea

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

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

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Diagnostic and Management Approach to Common Sleep Disorders During Pregnancy

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

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Thanks for your attention