Obstructive Sleep Apnea Syndrome (OSA) During Pregnancy. Maternal-Fetal Implications

Francisco José Roig Vazquez*
Doctor of Medicine, Specialist in Pneumology, Hospital Quirónsalud Toledo

*Corresponding Author: Francisco José Roig Vazquez, Doctor of Medicine, Specialist in Pneumology, Hospital Quirónsalud Toledo.

Received: February 10, 2020; Published: February 27, 2020

Abstract

The association between sleep disorders during pregnancy and perinatal outcomes is essential for good maternal childcare. Adverse changes in the course of pregnancy due to sleep disorder can be permanent and structural in infants. Sleep disorders are rare in women of childbearing potential but several factors can contribute to making it more common during pregnancy. The lack of information and training for pregnant women, makes them not perceive this pathology with sufficient importance.

Keywords: Pregnancy; Sleep Disorders; Fetus; Obesity; Diabetes; Woman; Hypertension

Introduction

Pregnancy is a physiological stage in which women experience noticeable changes in hormone secretion, breathing physiology, cardiovascular function and sleep. Adverse changes in the course of pregnancy due to sleep disorder may be permanent and structural in infants [1]. Studying the association between sleep disorders during pregnancy and perinatal outcomes is essential for good maternal care.

Obstructive sleep apnea is an entity characterized by repeated episodes of airway obstruction during sleep, resulting in intermittent ventilation interruption, hypoxemia, and sleep fragmentation. If not treated, it can lead to cardiovascular, metabolic, neurological, as well as accidents. The term gestational apnea has not yet been formally classified and has no diagnostic code, but would refer to the OSA chart that develops with weight gain and respiratory changes in pregnancy that does not was present before gestation.

Current evidence shows that even mild sleep disorders such as snoring increase in frequency and intensity during pregnancy, affecting at least one-third of pregnant women in the last trimester [2-6] and may lead to adverse results [7].

Sleep disorders are rare in women of childbearing potential, but several factors may contribute to making it more common during pregnancy as hormonal changes occur such as increased estradiol involved in increased blood volume, tissue edema and rinitis that cause narrowing of the upper airway. There is also elevation of the diaphragm, consequent decrease in functional residual capacity and increase in oxygen consumption that is aggravated by the progression of gestation [2,8,9].

Prevalence and risk factors

The prevalence of OSA in pregnant women is not well established. The largest prospective study [10] indicates that it is 3.6% in the 1st trimester and 8.3% in the third trimester. In non-pregnant women the prevalence is 0.7 - 6.5% [11-14].

In recent decades the prevalence of sleep apnea syndrome has steadily increased in the general population probably due to the growing obesity epidemic [15-17]. As in the general population, overweight and obesity increase the risk of OSA in pregnant women [18-19]. The number of births in Spain in 2018 was 369,302 with an average age of pregnant women of 32 years and an overweight rate of 21.8% and 10.6% when referring to obesity [20].

Physiological changes typical of pregnancy such as narrowing of oropharynx, hyperemia and nasal mucosa oedema and increased levels of progesterone may favor greater propensity to snoring and sleep apnea [21-22].

 Diagnostic

There is an accepted belief that poor sleep is expected during pregnancy. Unlike men, symptoms in women are more nonspecific such as tiredness, morning headaches and depression regardless of the degree of severity of OSA [23]. Excessive daytime sleepiness is highly prevalent (31% to 45.5%) even at the beginning of pregnancy being partly responsible for the increase in progesterone.

A meta-analysis of 24 studies documenting the quality of sleep in pregnancy found that 45.7% of pregnant women experience lack of sleep [24]. Mindell., et al [25] report that, using an online questionnaire, 100% of pregnant women reported frequent nocturnal awakenings and 78% needed some naps.

The presence of daytime sleepiness does not predict the presence of OSA because it can be caused by various entities such as restless legs syndrome, insomnia, or other factors such as nausea, cramps, dyspnea, contractions, fetal movements, nicturia, gastroesophageal reflux or increased body temperature. On the other hand, obstetrics specialists do not routinely ask their patients if they have snoring or apnea and few refer them for sleep study, referral rates are very low despite known risk factors.

Another cause of this underdiagnosis would be the resignation of pregnant women from undergoing a sleep study. One study notes that only 13% of at-risk pregnant women were subjected to polygraphy [26] and the reason is not entirely clear. On the other hand, the lack of information and training for pregnant women, makes them not perceive this pathology with sufficient importance and even less than 10% of women with sleep disorders attended their review appointments [27].

As for gestational OSA diagnostic methods, current questionnaires may not work at all stages of gestation [28]. Screening questionnaires, such as the Berlin questionnaire and the Epworth Sleepiness Scale (ESS), can be administered quickly and easily in clinical settings. However, these questionnaires were developed for the general population and have not performed well in identifying OSA among pregnant women. A meta-analysis analyzes the usefulness of sleep questionnaires for detecting possible OSA in pregnant women [29] given the previous inconsistent results and the explanation could be in several factors. Both pregnancy and OSA lead to similar sleep complaints, there is a continuous change in symptomatology according to the evolution of pregnancy, the standard and threshold for diagnosing OSA during pregnancy has not been defined and ultimately the optimal time of delivery of the questionnaire has not been standardized. The study points to a greater sensitivity of the Berlin questionnaire after 20 weeks of gestation. Epworth's questionnaire was of little help in detecting possible OSA in pregnancy, however, a score > 16 points was associated with gestational diabetes. Epworth is unpredictive of OSA in the non-pregnant population so it's no surprise that it doesn't predict OSA in pregnancy [30,31]. Therefore Bilgay., et al [32] propose a new algorithm model (BATE) for the screening of obstructive sleep apnea in gestation in which they point out that BMI, age and tongue size can predict gestational OSA.

The use of home polygraphy for diagnostic purposes is emerging and has already been used in several studies [33,34], but it seems to tend to underestimate severity and is likely to be more useful in detecting moderate-severe OSA. Because gestational sleep disorders move in the slightest spectrum, home polygraph devices may not have adequate sensitivity and should be used with caution [6,35]. The American Sleep Academy does not recommend the use of home polygraphy in pregnancy [36].
PSG (polysomnography) is the gold standard for diagnosis, but its cost, as well as waiting list delays can significantly delay the study by several months so new tools such as the recently validated watch-pat 200, have been used for these studies [37]. In the face of the limitation of diagnostic tools, the following risk factors should be considered: obesity, neck circumference greater than 40 centimeters, history of difficult airway, arterial hypertension, snoring more than 3 times per week, observed apnea or excessive drowsiness in situations where it should not occur. There are currently no regulatory data on the severity criteria of SAHS in gestation.

Clinical implications

The importance of OSA for maternal health during pregnancy is becoming clearer. OSA in pregnant women may be associated with cardiomyopathy, congestive heart failure, pulmonary edema, as well as 5 times more likely to die with an income related to her pregnancy [9,38]. A meta-analysis that included 35 studies concludes that OSA is linked to the risk of diabetes, hypertension, preeclampsia and preterm birth while snoring appeared to increase the risk of diabetes, hypertension and preeclampsia [39]. Among pregnant women, it has been estimated that the prevalence of snoring is 14 to 46% and these increase as gestation does [40,41]. There was no association between snoring type sleep disorder with adverse fetal results in weight and apgar score. Women with mild to moderate OSA have a double risk of developing hypertension around week 21-31 of gestation [42]. If OSA is demonstrated, we can reduce the risk of gestational arterial hypertension and thus prevent future cardiovascular and kidney diseases in these women [43]. In women with chronic high blood pressure there is a higher prevalence of OSA, as well as its severity compared to normotensive controls. O’Brien., et al. point out that 53% of pregnant women with chronic arterial hypertension reported snoring prior to pregnancy and subsequently during pregnancy were sharpened by developing arterial hypertension from the 1st trimester of gestation [44]. Therefore, we can consider that pregnant women with chronic arterial hypertension and strong snoring have a significant risk of OSA and preeclampsia. Recurrent cycles of hypoxia and reoxygenation produce oxidative stress and endothelial dysfunction that is believed to be part of the mechanism underlying the development of preeclampsia [45]. When administered nasal cpap with in women with preeclampsia, the average nocturnal blood pressure [46] is reduced but these results should be interpreted cautiously due to the lack of a control group.

Sleep disorders increase your risk of gestational diabetes by three times [47]. It is noted that snoring pregnant women have a higher prevalence of gestational diabetes [48].

In the case of pregnant women with OSA prior to gestation it is recommended to do the glucose tolerance test early as it is repeated at 24 - 28 weeks.

Multiple pregnancy is associated with adverse perinatal outcomes similar to those caused by OSA (premature birth, growth restriction, diabetes, and hypertension). This situation would be aggravated if the pregnant woman has unstudied OSA. The prevalence of OSA in multiple pregnancy is currently unknown and it is recommended to be considered as a risk group and that all women with multiple gestation should be studied in order to rule out sleep disorders [49].

A large study of women with OSA has shown that OSA doubles the chances of preterm birth [50]. Brown., et al. [51] states that there is a significant association between gestational OSA with preterm birth, caesarean section and small babies for gestational age. It is important to distinguish between fetal growth and fetal size. All studies published to date except one [30] have always reported the size of the fetus at birth, but not of its true growth. Kneitel., et al. suggest that OSA also plays a causal role in fetal growth deterioration especially throughout the 3rd trimester of gestation [52]. The effect of maternal OSA on the fetus, particularly on fetal growth, is still a matter of controversy. In humans, adverse fetal results appear to exist, such as intrauterine growth retardation, low apgar test score, preterm birth and Neonates ICU admissions [30,53-55]. To date, only one study has been conducted showing that mild maternal OSA in non-obese pregnant women with gestational diabetes or hypertensive disorder is associated with accelerated fetal growth expressed in the dimensions of the fetus [56]. In male descending mice when they reach adulthood it is observed that gestational intermittent hypoxia induces metabolic dysfunction which is reflected in an increase in body weight and adiposity index [57], suggesting long-term metabolic dysregulation. It
has been observed that the placenta in pregnant women with SAHS has more weight and that it correlates with the severity of OSA. This is why close monitoring of placental function and fetal growth is recommended especially in the third trimester of gestation [58].

As for the possible affectation of OSA on the fetus’ heart rate, the largest available study [59] notes that apnea episodes were not associated with heart rhythm disturbances.

There are no quality data on how gestational SAHS influences the risk of fetal death. The broader revision in this regard reported a modest increase [60].

Decreased telomeres in DNA obtained from umbilical cord blood samples have been detected, which may be associated with accelerated aging and age-related diseases [61,62].

Disorderly sleep can contribute to the severity of postnatal depression, as well as fetal well-being, assuming an increased risk of baby disorder from attention deficit hyperactivity [63,64].

Treatment

As for the pharmacological treatment of SAHS at gestation, no drug prevents or cures upper airway obstruction. Modafinil has been used to treat excessive residual daytime sleepiness in patients already treated correctly with CPAP but is currently contraindicated for use in pregnant women [65] More studies are still needed to determine the impact of autotcap treatment however early identifying this pathology can have positive effects on long-term health outcomes after pregnancy. The most appropriate intervention for snoring is supposed to be autotcap since other methods such as surgery or jaw devices may not be appropriate due to concerns about safety or efficacy in pregnancy. At least small studies show that it is safe, can be tolerated in pregnancy and can improve gestation-induced arterial hypertension, preeclampsia and gestational diabetes [43]. A recent randomized controlled trial [66] assesses the effects of autotcap on obese pregnant women with diabetes and OSA between week 24 to 34 of gestation. The study shows that a combination treatment with diet and autotcap significantly improved the function of cells after 2 weeks of treatment and that their continued use is likely to be associated with lower rates of preterm birth, unplanned caesarea and neonatal ICU admission especially in those women with worse glycaemic control. Treatment with autotcap may also improve glycaemic control, but there are no previous studies in pregnant women [67].

Positional OSA is most common in mild cases and appropriate intervention is likely to correct the sleep posture to be best suited by indicating that sleeping on the side is the right thing to do. While CPAP is safe, many patients find it very uncomfortable or do not tolerate it. Insomnia is an adverse effect on treatment compliance [68] equally linked to the psychological impact on the mother of diagnosing OSA and its implications. Therefore, it is essential that professionals are adequately trained to avoid excessive anxiety in pregnant women.

It is recommended that pregnant women with mild OSA should be treated if they have recurrent desaturations below 90% because of the potential adverse effect of hypoxia on the fetus.

With regard to the use of jaw advance devices in pregnant women there are no data available to recommend their use. Also uvulopalatopharyngoplasty is also not recommended.

Recommendations

Emerging data indicate that women with OSA in pregnancy have an increased risk of complications related to pregnancy and anesthesia. Gestation affected by OSA should be considered as risky. It becomes necessary to develop, OSA specific peripartum management guidelines but the American Society of Anaesthetists gives guidance guidelines [69]. Given the increased risk of requiring cesarean delivery, they should be treated as presurgical patients and sent for anesthesia consultation in the third trimester of gestation. Pregnant women diagnosed with OSA are recommended to use autotcap during childbirth recovery and avoid the use of morphic pain.
The current recommendation is that all obstetric patients should be evaluated through a questionnaire at prenatal consultation, to detect risk of OSA and this assessment should be done around week 12 to 18 of gestation to allow for a time appropriate for evaluation and possible early treatment. If the patient is suspected to be at risk of OSA, she should be referred to a sleep specialist for evaluation and treatment.

All women diagnosed with SAHS or suspected SAHS during pregnancy should be followed after delivery and sleep tests repeated at least 8 to 12 after delivery as at least 80% of weight gain is not lost until 6 weeks.

Bibliography
A Review of Cellular Senescence and Senolytic Drugs Use in Idiopathic Pulmonary Fibrosis


A Review of Cellular Senescence and Senolytic Drugs Use in Idiopathic Pulmonary Fibrosis


