

Obesity and pregnancy

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ABSTRACT

Obesity and overweight, the most common metabolic disorders, have an increased incidence among women of reproductive age and represent major risk factors in obstetrics. Maternal obesity predisposes to multiple maternal and fetal complications, like pregnancy-induced hypertension, gestational diabetes, thromboembolic complications, recurrent miscarriages, stillbirth, macrosomia, congenital abnormalities.

Keywords: gestational diabetes, hypertension, insulin resistance, obesity, macrosomia

INTRODUCTION

The body mass index (BMI) is the best indicator of obesity. Obesity is defined as a BMI > 30 kg/m². Obesity among pregnant women is a real public health problem. In the last decade there has been a significant increase in the incidence of obesity among women of reproductive age, posing serious pregnancy management problems. The most common causes of obesity are sedentary lifestyle and consumption of fast-food products. [1-3]. The normal weight gain during pregnancy is between 11.5 and 16 kg [4].

MATERIALS AND METHODS

A PubMed, Web of Science systematic electronic search was undertaken using keywords like “obesity in pregnancy”, “pregnancy complications”, “pregnancy outcome”, “body mass index”, “gestational diabetes”, “stillbirth”. The search included systematic reviews, randomized controlled trials, review articles, meta-analyses and resulted in 250 articles, from which only 20 papers were further reviewed and included in the final review.

MATERNAL COMPLICATIONS

Pregnancy-induced hypertension

Pregnancy-induced hypertension and preeclampsia are more common in obese patients, probably because of insulin resistance. This pathology can be classified in four classes: 1 - chronic hypertension (blood pressure > 140/90 mmHg before 20 weeks of gestation), 2 - preeclampsia and eclampsia, 3 - preeclampsia superimposed over chronic hypertension, 4 - gestational hypertension [5]. This obesity complication causes increased morbidity through intrauterine growth restriction, death of the fetus and mother, placental abruption, stroke [6].

Preeclampsia is the hypertension that appears after the 20th week of pregnancy, accompanied by edema and albuminuria. Obesity, hypertriglyceridemia and insulin resistance are the factors that contribute to endothelial dysfunction, a central element in the pathogenesis of preeclampsia. Endothelial dysfunction increases peroxidase production and decreases prostacyclin secretion, resulting in vasoconstriction and platelet aggregation [3].

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Gestational diabetes mellitus

Obesity before pregnancy is an important risk factor for gestational diabetes, regardless of the weight gain during pregnancy. Although there are many factors that contribute to this disease, such as age, family history and ethnicity, obesity is an independent risk factor, obese women having a 6 times higher risk than other pregnant women to develop gestational diabetes [6-8].

Obesity is associated with insulin resistance, decreased glucose absorption in adipose tissue and skeletal muscles, increased hepatic glucose production. Adipose tissue is a source of inflammatory cytokines, so obesity can be considered a state of chronic inflammation, obese pregnant women having high concentrations of C-reactive protein [3,9,10]. Gestational diabetes is the result of insufficient insulin secretion to compensate for increased insulin resistance during pregnancy. Screening for gestational diabetes is done between 24 and 28 weeks of gestation, but in case the obese pregnant women has family history of type 2 diabetes mellitus it can be done earlier [11].

Thromboembolism

Pregnancy itself is a cause of increased procoagulant status by rising the plasmatic concentrations of coagulation factors I, VII, VIII and X, inhibition of fibrinolysis and a decrease in protein S concentration [12]. Obesity also promotes venous stasis and increases blood viscosity. The highest risk of thrombosis is associated with cesarean delivery. According to some studies, maternal obesity doubles the risk of thrombosis by increasing the concentration of coagulation factors VIII and IX [12].

Miscarriage

Obesity increases the risk of recurrent miscarriages and abortion during the first trimester of pregnancy. The exact mechanism is still not well known, but it may be a negative effect of the obesity over endometrial development and oocyte quality [13]. The miscarriage rate in obese pregnant women seems to increase with insulin resistance [14].

FETAL COMPLICATIONS

Congenital malformations

In obese pregnant women, neural tube defects in the fetus have been most frequently reported. The appearance of these malformations is independent of nutritional factors such as the administration of folic acid, which has a less important effect in obese than normal weight pregnant women. Moreover, there is also an increased risk of heart defects, om-

phalocele and plurimalformative syndroms [15,16]. It seems that when obesity is associated with pre-existing type 2 diabetes mellitus, the risk of malformations increases [17].

The high incidence of malformations can also be explained by the difficulty of performing prenatal ultrasound screening due to difficult examination caused by the adipose tissue excess [12].

Macrosomia

Macrosomia represents birth weight greater than 4000 g or a percentile over 90 and is associated with obesity in pregnancy [3]. Obesity and insulin resistance before pregnancy affect fetal growth, altering placental function, which in the last part of the pregnancy increases the availability of glucose, amino acids and free fatty acids for the fetus. Moreover, maternal hyperglycemia produces fetal hyperglycemia that in the end leads to fetal pancreatic hypertrophy and hyperinsulinemia, the last one having a direct effect on cell division leading to macrosomia [12,18].

Perinatal mortality

Maternal obesity is associated with a high risk of *in utero* death of the fetus and early neonatal death. Numerous studies have shown that the risk of *in utero* fetal death is double in patients with a BMI > 30 kg / m². Obesity is frequently associated with hyperlipidemia, which, through a direct or indirect mechanism, affects endothelial cells causing vasoconstriction and platelet aggregation, contributing to preeclampsia. Furthermore, hyperlipidemia may increase the risk of placental thrombosis and decrease placental perfusion by reducing prostacyclin secretion and increasing thromboxane secretion. This risk can be amplified in association with insulin resistance which causes a decrease in fibrinolysis [15,19].

Shoulder dystocia

Shoulder dystocia is an obstetrical emergency that occurs when the birth beyond the fetal head is obstructed by the impact of the fetal shoulders. The risks of this emergency are fetal death, fractures, neurological and hypoxic sequelae. It is frequently reported in association with macrosomia [3,20].

INTRAPARTUM COMPLICATIONS

Post term pregnancy is common in obese pregnant women, probably due to the high concentrations of estrogen in the adipose tissue that can disrupt the hormonal balance and mechanisms that induce labor [21,22]. The rate of induced labor in obese patients is higher in comparison with patients

with normal BMI. Labor is usually long, thus explaining the more frequent use of oxytocin [15]. Also, the percentage of instrumentally assisted births due to macrosomic fetuses is increased. Moreover, if cesarean delivery is necessary, it involves major maternal risks, such as wound infection, endometritis and increased blood loss > 1000 ml [15,23]. It is also important to mention that monitoring fetal heart rate in labor is difficult due to excess adipose tissue. For contraction monitoring is frequently used manual palpation [13].

POSTPARTUM COMPLICATIONS

Obese patients, regardless of the way of birth, have an increased risk of postpartum hemorrhage.

These patients also have equally important risks of developing urinary tract infections, wound infections and vaginal infections. Finally, the increased thromboembolic risk should be mentioned, especially after cesarean delivery [15].

CONCLUSIONS

Obesity in pregnancy increases the risk for both maternal and neonatal complications. These patients need specific care during pregnancy and labor, so, some special protocols should be elaborated. Moreover, obese patients should be advised to adjust their weight before becoming pregnant to avoid complications.

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