

## Obesity and cardiovascular risk in pregnant women

### *Obesidad y riesgo cardiovascular en la gestante*

Nélida L. Sarasa Muñoz<sup>a</sup>, MD, PhD; Danay Hernández Díaz<sup>a</sup>, MD; and Jesús A. Satorre Ygualada<sup>b</sup>, MD, MSc

<sup>a</sup> Universidad de Ciencias Médicas Dr. Serafín Ruiz de Zárate Ruiz. Santa Clara, Villa Clara, Cuba.

<sup>b</sup> Cardiocentro Ernesto Che Guevara. Santa Clara, Villa Clara, Cuba.

Received: May 5, 2016

Accepted: June 2, 2016

*Key words:* Obesity, Cardiovascular risk, Pregnant women

*Palabras clave:* Obesidad, Riesgo cardiovascular, Gestante

#### To the Editor:

Obesity is a chronic disease, which has been considered as the epidemic of the XXI century<sup>1</sup>. Its spread is produced from highly industrialized countries towards those of low economic and industrial potential, and it is a responsibility of health services and systems globally. This epidemic has particularly affected the female sex, to the point that in 2014 about 15% of the world's female population was obese<sup>2</sup>, a situation doubly threatening because of the risk of perpetuating this condition in successive generations through reproduction; responsibility that lies in pregnant women with overweight, to which it is added that, in recent decades, more and more women reach conception in overweight or obese condition<sup>3</sup>.

The relationship between obesity and cardiovascular disease is complex due to the several pathophysiological mechanisms involved and the large number of interrelated factors<sup>4</sup>. Obesity can cause high blood pressure, type 2 diabetes mellitus and coronary atherosclerosis (also by the presence of dyslipidemia), although evidence of such an association can include many other factors such as: subclinical inflammation, neurohormonal activation with increased sympathetic tone, high concentrations of leptin and insulin, obstructive sleep apnea and increased exchange of free fatty acids, and also ectopic deposition of adipose tissue in specific areas of the body, such as the myocardium, large vessels,

renal arteries and the hepatic parenchyma; which can cause atheromatous deposits, that detected early, contribute to the primary prevention of cardiovascular disease, which is particularly important in a vulnerable stage to obesity and central fat distribution, such as pregnancy<sup>5</sup>.

In the specific case of waist circumference, although its measurement is useful in the estimation of central adiposity, it requires more precise methods to detect differences even among obese people who show similar values of this indicator and general adiposity comparable by the values of the body mass index (BMI). It has also been found possible to identify two different patterns of distribution of adipose tissue: one in which the subcutaneous cellular tissue is low, as most of it is accumulated in the intraperitoneal compartment; and another, in which the fat is deposited almost primarily in the subcutaneous space. This explains how to the classic indicators of body and abdominal fat are added others, such as indexes and visceral body fat, and waist/height index, which have been recognized as anthropometric parameters more useful than the ones previously used in the prediction of cardiovascular disease and metabolic disorders<sup>6,7</sup>.

A study published in 2014<sup>8</sup> reported the results of the waist/height index association to major cardiovascular risk factors in women between 50 and 60 years, while it stated that it constitutes a simple and practical tool to guide nutritional care for women with increasing age and the distribution of abdo-

minovisceral fat.

The waist/height index is an alternative anthropometric indicator able to identify metabolic risk factors where the BMI and waist/hip index were normal; in addition, it is recommended in the prevention of diseases related to cardiovascular risk. Nevertheless, it is necessary to increase the works aimed at identifying the point of more sensitive assessment of excess of abdominovisceral fat, as well as to assess the risk of development of chronic non-communicable diseases to support its clinical utility, specifically for different population groups<sup>8</sup>. These anthropometric indicators are often used as indirect measurements of visceral fat in healthy population and their study also suggested during pregnancy<sup>9</sup>, as prevention of transgenerational perpetuation of obesity<sup>10</sup>.

They are also peculiarities associated with intra-abdominal adipose localization, the effect on the endocrine-metabolic system, higher than the overall amount of adipose tissue<sup>11</sup>, predisposing to diabetes and cardiovascular disease. Specifically, visceral adiposity is associated with insulin resistance, diabetes, dyslipidemia, systemic inflammation, hypertension, myocardial infarction and many other causes of death<sup>12</sup>.

The risks of obesity for pregnant women have different connotations depending on the characteristics of the distribution of adipose tissue in their body although the cause-effect relation has not been fully clarified.

Regardless of the woman's BMI before pregnancy, the deposit of fat during pregnancy usually predominates in the central and preferably perivisceral location, with great impact on the cardiometabolic risks<sup>13</sup>, a fact that has been extensively studied in the last decades.

A meta-analysis presented early this century<sup>14</sup> reports the consensus on cardiovascular protection of pregnant women that exceed their body weight, with actions from the first quarter in which the cardiac function is evaluated, as in the second, as well as performing a Doppler ultrasound of the uterine arteries around the 23rd week of gestation (22-24), as part of identifying the preeclampsia.

A brief reflection about the gravity that may be present in this area is what we have wanted to present to the scientific community through the CorSalud pages. In a study, in a health area of the municipality of Santa Clara, Cuba, when registering pregnancy women with the family doctor, in 883 supposedly healthy pregnant women between 20 and 29 years of

age, it was found that while 59.2% of women arrived to their pregnancy with an adequate nutritional status, because of their BMI, 51% were classified as obese and 26.8% reached the limit condition according to the percentage of fat in their body composition; indicating that about 80% of pregnant women had the proportion body fat in excess at the beginning of the pregnancy, even though according to the classification done -by national indication of the Mother and Child Care Program, the traditional BMI- a much better overview was found<sup>15</sup>.

In this sample, the waist/height index exceeded the limits of cardiovascular risk in 738 pregnant women, representing 83.6% of the sample of the healthy pregnant women studied; matching results with the reported in other contexts, but referring to women of older ages<sup>8</sup>.

These findings call for reflection on the need to be alert in the adiposity of pregnant women, their regional distribution and anthropometric assessments, sometimes to early warning potential risks to the health of the mother and the result of the gestation.

## CONFLICTS OF INTEREST

None

## REFERENCES

1. OMS. Obesidad y sobrepeso [Internet]. Centro de Prensa OMS; 2016 [Accessed Abr 4, 2016]. Available at: <http://www.who.int/mediacentre/factsheets/fs311/es/>
2. Frias AE, Grove KL. Obesity: a transgenerational problem linked to nutrition during pregnancy. *Semin Reprod Med.* 2012;30:472-8.
3. American College of Obstetricians and Gynecologists. ACOG Committee opinion N°. 548: Weight gain during pregnancy. *Obstet Gynecol.* 2013;121: 210-2.
4. Moreno-Martínez FL. Obesidad y distribución regional de la grasa: viejos temas con nuevas reflexiones. *CorSalud* [Internet]. 2011 [Accessed Abr 17, 2016];3:1-3. Available at: <http://www.corsalud.sld.cu/sumario/2011/v3n1a11/distribucion.htm>
5. López-Jiménez F, Cortés-Bergoderi M. Obesidad y corazón. *Rev Esp Cardiol.* 2011;64:140-9.

6. Lee SH, Ha HS, Park Y-J, Lee JH, Yim HW, Yoon KH, *et al.* Prevalence and characteristics of metabolically obese but normal weight and metabolically healthy but obese in middle-aged Koreans: the chungju metabolic disease cohort (CMC) Study. *Endocrinol Metab.* 2011;26:133-41.
7. Stepien M, Stepien A, Wlazel RN, Paradowski M, Rizzo M, Banach M, *et al.* Predictors of insulin resistance in patients with obesity: a pilot study. *Angiology.* 2014;65:22-30.
8. Torresani ME, Oliva ML, Rossi ML, Echevarría C, Maffei L, *et al.* Riesgo cardiovascular según el índice cintura/talla en mujeres adultas. *Actual Nutr.* 2014;15:3-9.
9. Orozco Muñoz C, Sarasa Muñoz NL, Cañizares Luna O, Hernández Díaz D, Limas Pérez Y, Machado Díaz B. Retención de peso postparto y riesgo cardiovascular. *CorSalud* [Internet]. 2016 [Accessed Abr 17, 2016];8:94-101. Available at: <http://www.revcorsalud.sld.cu/index.php/cors/article/view/105/248>
10. Straughen JK, Trudeau S, Misra VK. Changes in adipose tissue distribution during pregnancy in overweight and obese compared with normal weight women. *Nutr Diabetes* [Internet]. 2013 [Accessed Abr 14, 2016];3:e84. Available at: <http://www.nature.com/nutd/journal/v3/n8/pdf/nutd201325a.pdf>
11. Ryo M, Kishida K, Nakamura T, Yoshizumi T, Funahashi T, Shimomura I. Clinical significance of visceral adiposity assessed by computed tomography: A Japanese perspective. *World J Radiol.* 2014;6:409-16.
12. Demerath EW, Reed D, Rogers N, Sun SS, Lee M, Choh AC, *et al.* Visceral adiposity and its anatomical distribution as predictors of the metabolic syndrome and cardiometabolic risk factor levels. *Am J Clin Nutr.* 2008;88:1263-71.
13. Nelson SM, Matthews P, Poston L. Maternal metabolism and obesity: modifiable determinants of pregnancy outcome. *Hum Reprod Update.* 2010;16:255-75.
14. Gonzales Medina CA, Alegría Guerrero CR. ¿Es posible predecir la preeclampsia? *Rev Peru Ginecol Obstet.* 2014;60:363-72.
15. Ministerio de Salud Pública. Programa Nacional de Atención Materno Infantil 1999 [Internet]. La Habana: MINSAP; 1999 [Accessed Abr 10, 2016]. Available at: <http://files.sld.cu/sida/files/2012/01/programa-nacional-de-atencion-materno-infantil-1999.pdf>