Introduction

Obesity is a major public health concern worldwide and an established risk factor for type-2 diabetes, insulin resistance, metabolic syndrome and cardiovascular disease, contributing to increased morbidity and mortality. Obesity is traditionally associated with high caloric intake and low physical activity, but recent in vitro studies suggest that exposure to endocrine disrupting chemicals (EDCs), including persistent organic pollutants such as hexachlorobenzene (HCB), \( \gamma \)-hexachlorohexane (\( \gamma \)-HCH), \( o,p' \)-dichloro-diphenyltrichloroethane (\( o,p' \)-DDT) or polychlorinated biphenyls (PCBs), may disrupt crucial pathways involved in adipogenesis and increase the risk of obesity, acting as “obesogens”.

The aim of this study was to evaluate the association between adipose tissue concentrations of selected EDCs and obesity/insulin resistance-related markers.

Conclusion

The consistency of our results suggest that EDC levels of persistent organic pollutants in adipose tissue, which may indicate long-term exposure, might represent an additional risk factor for obesity and insulin resistance, despite the cross-sectional study design.

Results

Obese (BMI 30-40 kg/m\(^2\)) and morbidly obese (BMI \( \geq 40 \) kg/m\(^2\)) subjects had higher adipose tissue concentrations of most studied EDCs (OR: 1.23-1.99 for obese, and 1.63-3.46 for morbidly obese), with statistical significance for HCB, \( p,p' \)-DDE, \( o,p' \)-DDT and \( \gamma \)-HCH (Figure 1).

Figure 1. Influence of EDC exposure on the risk of obesity and morbid obesity

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Los autores declaran que no tienen conflicto de intereses
Adipose tissue HCB and γ-HCH levels were also positively and significantly associated with HOMA-IR levels (OR:1.40-1.45 for patients with HOMA-IR≥3) (Figure 2).

Moreover, obese/morbidly obese subjects (BMI≥30kg/m²) with HOMA-IR≥3 had higher adipose tissue levels of HCB, p,p'-DDE, o,p'-DDT and γ-HCH than those with HOMA-IR<3 (Figure 3).

A cross-sectional study was conducted in 125 obese/non-obese subjects with/without insulin resistance undergoing surgery in the Nutrition and Endocrinology Unit of Virgen de la Victoria Hospital [Málaga (Spain)] and not receiving blood glucose-lowering treatment. Anthropometric measures were gathered and body mass index (BMI) and homeostasis model assessment of insulin resistance (HOMA-IR) were calculated. Adipose tissue EDC concentrations were quantified by GC-MS/MS. Associations between EDCs and obesity/insulin resistance markers were examined using binary and multinomial logistic regression analyses adjusted for potential confounders, such as age and sex.