Obesity and recurrent vulvovaginal bacterial infections in women of reproductive age

Obesity, defined as an excessive deposition of body fat, and usually reported as body mass index (BMI) exceeding 30 kg/m², has been linked to increased morbidity and mortality and has been associated with an increased risk of cancer, cardiovascular diseases, Type II diabetes (DM) and infections.[1–5] Obesity is a low-grade inflammatory state,[6 7] and adipose tissue is an active immunological organ with increased production of tumour necrosis factor α, interleukin (IL)-1β and IL-6.[8] Obesity is associated with an increased susceptibility to infections; however, the results of clinical studies evaluating BMI and vaginitis are controversial.[9] The aim of the discussed study was to determine the association between obesity and recurrent vulvovaginal bacterial infections (RVVBI) in women of reproductive age.

This study was conducted at the gynaecology clinics at Texas Tech University Health Sciences Center at the Permian Basin between April 2013 and December 2015. The TTUHSC Institutional Review Board approved the study that is part of a database collection registered at ClinicalTrials.gov.

Non-pregnant patients (age range 18–40 years old) with a history of RVVBI, as defined by the International Society for the Study of Vulvovaginal Disease were included in this study (n=55), as well as age-matched controls (n=50). Patients' BMI at the clinic visit was recorded. Additionally, vaginal swabs were analysed using quantitative PCR as described by us previously.[10] The following bacterial species were included: *Gardnerella vaginalis*, *Atopobium vaginae*, *Megasphaera* type I, *Megasphaera* type II, bacterial vaginosis-associated bacterium 2, *Ureaplasma urealiticum* and *Mycoplasma genitalis*. *Lactobacilli* were discerned using qPCR assay that identified *L. jensenii*, *L. crispatus* and *L. gasseri*.[11 12] Statistical analysis was performed with GraphPad software (La Jolla, California, USA). Categorical data were analysed with χ^2 two sites, Student's t-test was used for differences in continuous variables. A multivariate logistic regression model (with backward elimination) was made to identify independent risk factors associated with RVVBI. ORs and their 95% CIs were calculated, and p <0.05 was considered to be significant.

The BMI in the group of patients with RVVBI was 35±4 kg/m² vs 26±3 kg/m² in the control group (p<0.001). Multivariate logistic regression analysis indicated that higher BMI was associated with RVVBI (OR 4.00, 95% CI 3.1 to 4.52) (p=0.001). Obesity was also associated with the presence of *L. iners* and IL-1rα, IL-6, IL-12 and IL-17 (p=0.01 to p=0.001).

The pathophysiology behind obesity-driven, increased susceptibility to infectious diseases is not well understood.

The leading bacteria in the vaginal milieu in humans are *Lactobacilli*.[10] They hold antimicrobial properties that control the vaginal milieu and the urogenital microbiota. *L. iners*, first described by Antonio, has been associated with both: normal vaginal milieu and vagina colonised by species of bacterial vaginosis[6]; our data are in agreement with this observation.

The present study is the first to describe the association between BMI and RVVBI. This study has several limitations including the retrospective design, absence of information regarding patients' ethnicity, sexual history and DM.

Based on the evidence obtained in this study, obesity might be an independent risk factor for RVVBI in women of reproductive age through the mechanism of altered vaginal immunity.

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Contributors GV had the idea for the article and is the guarantor. NK performed the literature search and wrote the manuscript. KH and JL performed data collection and approved the final version of the manuscript. SEG performed experimental work and approved the final version of the manuscript. NS-L performed experimental work, performed literature search, wrote the manuscript and approved the final version of the manuscript.

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