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Obesity is associated with a decreased risk of carcinogenic HPV infection and cervical intraepithelial neoplasia in a population of young healthy women

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Background: Differential white blood cell (WBC) counts are routinely used as markers of overall health status as abnormal values can indicate infection, cancer, and other inflammatory diseases. Recently, differences in WBC within normal ranges have been associated with obesity and metabolic syndrome in older populations. However, few studies have evaluated the relationship between WBC levels, obesity and risk of HPV infection and associated disease.

Methods: Participants were recruited from the human papillomavirus (HPV) 16/18 vaccine trial in Guanacaste, Costa Rica which enrolled 7,386 healthy young women between the ages of 18 and 25. A complete blood count (CBC) was performed as part of a routine clinical assessment at trial enrollment. We performed a cross-sectional study to investigate the associations between circulating leukocyte measures (granulocytes, lymphocytes, monocytes, total WBC), and BMI (underweight (<18.4), normal weight (18.5-25), overweight (25.1-30), obese (>30)), and evaluated the influence of obesity on HPV infection and HPV-associated cervical intraepithelial neoplasia (CIN) lesions in this population. Adjusted logistic regression models were fitted to assess factors associated with (i) leukocyte markers and (ii) HPV infection and associated disease. Adjusted odds ratios (AdjOR) and 95% confidence intervals (95% CI) are presented. Models were adjusted for risk factors typically associated with HPV infection.

Results: There was a statistically significant association with higher BMI and higher numbers of granulocytes (AdjORGranulocyte high vs. low tertile: 4.03; 95% CI (3.30, 4.91)), lymphocytes (AdjORLymphycyte high vs. low tertile: 2.87; 95% CI (2.34, 3.51)), monocytes (AdjORMonocytes high vs. low tertile: 2.84; 95% CI (2.22, 3.63)), and WBC (AdjORWBC high vs. low tertile: 4.71; 95% CI (3.87, 5.81)). We observed a decreased association between carcinogenic HPV, but not for non-carcinogenic HPV, for overweight (AdjOR Overweight carcinogenic HPV+ vs.HPV negative: 0.83; 95% CI (0.72, 0.97)) and obese (AdjORObesecarcinogenic HPV+ vs. HPV negative: 0.74; 95% CI (0.62, 0.89)) women.Compared to normal weight individuals, obese women had decreased odds of being positive for carcinogenic HPV with low grade CIN (<CIN2) (AdjORObese<CIN 2 vs. HPV negative: 0.67; 95% CI (0.51, 0.88)) orHPV positive with high grade CIN (CIN2+) (AdjORObeseCIN2+ vs. HPV negative: 0.54; 95% CI (0.35, 0.83).

Conclusions: Increased leukocyte counts were associated with obesity and a decreased risk of prevalent carcinogenic HPV infection and CIN. This study is the first to demonstrate that BMI is a strong determinant of circulating leukocyte counts in a population of young, healthy women. Our findings for the decreased associations of obesity with carcinogenic HPV infection and CIN require replication.

Biography

Martha M Sklavos earned her undergraduate degree from Johns Hopkins University andher PhD in Immunology from the University of Pittsburgh School of Medicine. Currently, Martha is a post-doctoral fellow at the HPV Immunology Laboratory at the Frederick National Laboratory for Cancer Research where she was awarded a grant from the National Cancer Institute to investigate a novel biomarker for cervical cancer risk. She is now leading several studies to define the role of this novel biomarker in additional cancer types. Martha enjoys conceptualizing ideas and driving projects forward and hopes to fill a similar role in the pharmaceutical industry upon completion of her post-doctoral training.

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