AOGS
ACTA Obstetricia et Gynecologica Scandinavica

MAIN RESEARCH ARTICLE

Cervical precancerous lesions – chromosomal instability in peripheral blood lymphocytes in relation to lesion stage, age and smoking habits

OLIVERA MILOŠEVIĆ-DJORDJEVIĆ[1,2], IVANA STOŠIĆ[1], DARKO GRUJIČIĆ[1], DRAGIĆ BANKOVIĆ[1] & SLOBODAN ARSENIJEVIĆ[2]

[1]*Faculty of Science and* [2]*Faculty of Medicine, University of Kragujevac, Kragujevac, Serbia*

Key words
cervical precancerous lesions, peripheral blood lymphocytes, lesion stage, micronuclei, chromosomal instability

Correspondence
Olivera Milošević-Djordjević, Faculty of Science, University of Kragujevac, Radoja Domanovića 12, PO Box 60, 34 000 Kragujevac, Serbia.
E-mail: olivera@kg.ac.rs

Conflict of interest
The authors have stated explicitly that there are no conflicts of interest in connection with this article.

Received: 9 December 2010
Accepted: 21 June 2011

DOI: 10.1111/j.1600-0412.2011.01230.x

Abstract

Objective. To evaluate chromosomal damage in peripheral blood lymphocytes (PBL) of patients newly diagnosed with cervical precancerous lesions with respect to age, smoking habits, miscarriages, abortions and lesion stage. *Design*. Clinical study. *Setting*. Clinic of Gynecology and Obstetrics in Kragujevac, Serbia, during 2009-2010. *Population*. The analyzed samples included 41 untreated patients aged 24–65years with a diagnosed low-grade squamous intraepithelial lesion (LSIL; 19 patients) or a high-grade squamous intraepithelial lesion (HSIL; 22 patients). Control samples were obtained from 40 healthy women aged 24–53 years. *Methods*. The frequency of micronuclei (MN) was estimated in circulating lymphocytes by using the cytokinesis-block micronucleus assay. *Main Outcome Measure*. The frequency of MN in PBL. *Results*. The mean MN frequencies of both LSIL and HSIL patients were significantly higher than the MN frequency of healthy control women. There was no significant difference in MN frequency between LSIL and HSIL patients, between smokers and nonsmokers in both patient and control samples, or between miscarriage groups and abortion groups of patients. Considering confounder factors, age and health status influenced MN frequency. *Conclusions*. The results suggest that MN frequency in PBL of patients with cervical precancerous lesions corresponds to an increase of chromosomal damage, irrespective of smoking habits, miscarriages, abortions and lesion stages.

Abbreviations: BN, binucleated; HPV, human papilloma virus; HSIL, high-grade squamous intraepithelial lesions; LSIL, low-grade squamous intraepithelial lesions; MN, micronuclei; PBL, peripheral blood lymphocytes

Introduction

Cervical cancer is the second most common female malignancy. Cervical cancer develops through a multistep process that includes either three (cervical intraepithelial neoplasia or CIN I–III) or, according to the Bethesda system, two lesion stages [low-grade squamous intraepithelial lesions (LSIL) and high-grade squamous intraepithelial lesions (HSIL)]. When the lesions do not progress, they either regress or persist at the same grade. Low-grade squamous intraepithelial lesions are likely to regress, while HSIL are more likely to progress towards cancer (1).

Chromosomal instability is a main characteristic of cancer (2–5). Considering that cancerogenesis is a complex stepwise process and that the accumulation of genetic alterations allows growth of neoplastic cells, chromosomal instability is a possible event in the precancerous stages. This assumption has been confirmed through numerous studies showing that chromosomal instability occurs in precancerous lesions. Desai et al. (6) demonstrated that oral precancerous lesions are associated with an increased number of micronuclei (MN) both in circulating lymphocytes and in oral exfoliated cells. Likewise, Saran et al. (7) observed a significant stepwise increase of micronucleated cells and micronuclei in buccal epithelial cells from control to oral precancer patients. Increased baseline DNA damage was shown by applying the Comet assay in buccal cells and lymphocytes (7).

© 2011 The Authors