

Linear trend analysis of patients with cervical cancer treated at the Institute of Oncology Vojvodina in 2001-2007

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Summary

Purpose: Cervical cancer is the leading cause of death in women with gynecological cancers in Vojvodina. Serbia currently holds the leading place in Europe regarding the incidence of cervical carcinoma and comes second in terms of mortality.

Methods: Data were retrieved from the Register for malignant neoplasms of the Institute of Oncology Vojvodina for the period 2001-2007. The patients were divided in 3 groups according to the stage of disease based on the FIGO classification for cervical cancer. Data were analysed using linear trend and t-test.

Results: The linear trend of the number of registered cases in the group of stage I-IIA patients during 7 years showed no significant change in the prevalence of the disease. In the group of women diagnosed with stage IIB no statistical differ-

ence regarding either a rising or a decreasing trend was observed. The observed trend in an advanced disease stage (III and IV) showed a slight decrease in the number of patients, but without statistical significance.

Conclusion: The linear trend of the number of patients with cervical carcinoma during a 7-year period points to the fact that the number of newly detected cases of advanced disease stages did not decrease significantly despite the affordable and simple methods of early detection. This result underlines the importance of implementation of a National screening programme in the general population for early detection of cervical neoplasms. The excellent results of National screening programmes in other European countries lend support to this approach.

Key words: cervical cancer, incidence, linear trend

Introduction

Cervical carcinoma is the second most prevalent malignant disease in the female population, with about 470,000 newly discovered cases annually. Among developing countries, the highest incidence of cervical carcinoma has been observed in Romania (30.3/100,000), Poland (24.8/100,000), Bulgaria (24.6/100,000) and some of the countries of the former Yugoslavia (Bosnia & Herzegovina, 26.6/100,000) [1-3].

Cervical cancer is the leading cause of death in women with gynecologic malignancies in the mentioned countries, and Serbia currently holds the leading place in Europe regarding the incidence of cervical

carcinoma (35.9/100,000) and the second in terms of mortality [4-6].

According to the Register of Malignant Diseases in Vojvodina, at the Institute of Oncology Vojvodina, 2,783 newly discovered cases of cervical carcinoma were registered in the period between 1993 and 2002, with an incidence of 26.6/100,000 and a clear increase in incidence trend ($r=0.69$). This disease is usually discovered in the age group of 40-44 years [7]. By introducing screening programmes for the prevention and early detection of cervical carcinoma in the developed countries of Europe and the USA, mortality due to this disease has considerably been reduced in comparison with countries where such programmes have not been introduced yet.

Human papillomavirus (HPV) infection, first of all strains 16 and 18, is today considered as the basic cause of development of premalignant and malignant lesions of the uterine cervix. The largest number of women gets this infection during their reproductive period of life, when they are sexually most active. The infection is usually characterized as a temporary condition, which, if it persists even after the age of 30, may create premalignant and malignant changes in the uterine cervix [8,9].

Preventive measures and early detection of cervical carcinoma should include regular check-ups among women between 20-60 years of age, Pap smear in 3-5-year intervals, as well as combining cytological and colposcopic techniques, and recently, HPV detection. Great expectations in the field of prophylaxis are slowly becoming reality after the introduction of the vaccine against high-risk types of HPV [10,11].

Methods

Data were retrieved from the Register for malignant neoplasms of the Institute of Oncology Vojvodina for the period 2001-2007 and consisted of histopathological findings, clinical stage and kind of treatment. Cervical carcinoma was identified in 1,264 women during that period. Three groups of compiled data for the stated period according to FIGO disease stages for malignant neoplasms of the uterine cervix and the possibilities of operative treatment were defined.

The first group comprised all registered cases of FIGO stage I and IIA cervical carcinoma which were surgically treated.

The second group included FIGO stage IIB of cervical carcinoma where basic treatment method was chemoirradiation with brachytherapy.

The third group comprised cases with advanced FIGO stages III and IV cervical carcinoma with poor prognosis.

Statistical analysis

The statistical data processing was done using the method of the linear trend and the statistical hypothesis test (*t*-test).

The equation for the linear trend model is:

$$Y(t) = a + \beta t$$

where *t* is the time index. The parameters alpha and beta (the “intercept” and “slope” of the trend line) are usually estimated via a simple regression in which *Y* is the dependent variable and the time index *t* is the independent variable.

A *t*-test is any statistical hypothesis test in which the test statistic follows a Student’s *t* distribution. Among the most frequently used *t*-tests is a test of whether the slope of a regression line differs significantly from 0.

P-values were calculated on the basis of coefficient of linear correlation.

Results

The largest number of cases had FIGO stages I and IIA (*n*=345; 49%). However, patients with more advanced stages (IIB, III and IV) outnumbered those with early disease stages (Figure 1).

Most of the patients with stages I and IIA were registered in 2001 (*n*=107) and the fewest in 2004 (*n*=76; Figure 2).

In the group of women with stage IIB disease, no statistical significance regarding either the trend of rising or falling number of patients was noted. The largest number of women diagnosed in this stage was in 2004 (*n*=68; Figure 3).

The observed trend of the number of patients in an advanced stage showed a slight decline, but without statistical significance. Observing the absolute values, the largest number of these patients were diagnosed in 2003 (*n*=40) and the fewest in 2007 (*n*=22; Figure 4).

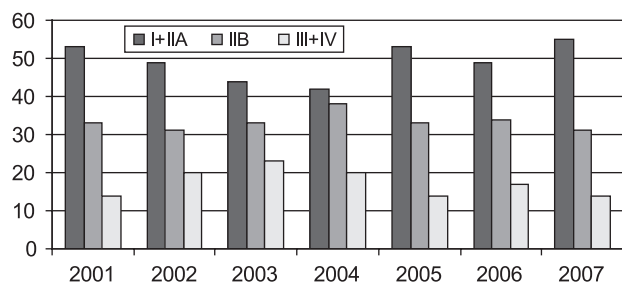


Figure 1. Percent stage structure of patients with cervical carcinoma. No statistically significant difference is noted.

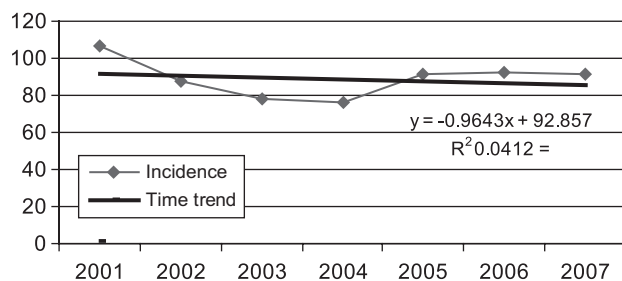


Figure 2. Linear trend of the number of patients with FIGO stages I and IIA cervical carcinoma for the period 2001-2007. No statistically significant difference is noted.

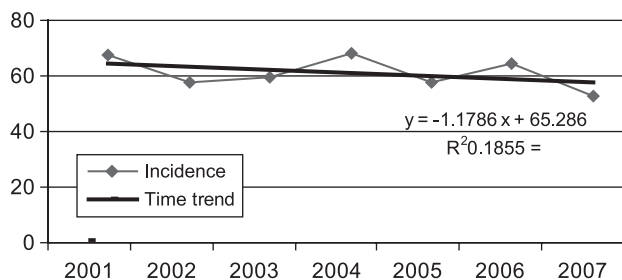


Figure 3. Linear trend of the number of patients with FIGO stage IIB cervical carcinoma for the period 2001-2007. No statistically significant difference is noted.

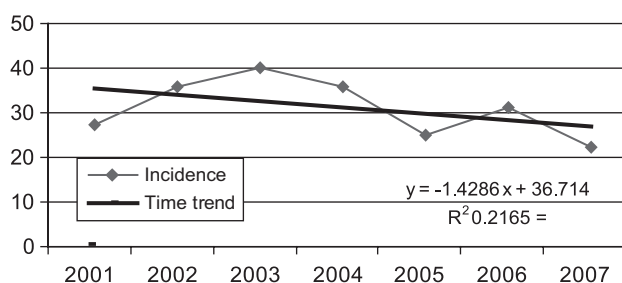


Figure 4. Linear trend of the number of patients with stages III and IV cervical carcinoma for the period 2001-2007. No statistically significant difference is noted.

Discussion

Cervical carcinoma still represents a significant problem in the developing countries. Almost 83% of cervical cancer cases are diagnosed in poor and developing countries, which do not operate an adequate screening programme. In these countries cervical cancer amounts to 15% of all malignancies in females, whereas the corresponding figure in the developed countries is 3.6% [12].

According to the data from the Cancer Register of central Serbia, cervical carcinoma is the most common gynecological cancer with 1,056 registered cases annually and with an incidence of 26.9/100,000. Data from 2001 show an incidence of cervical cancer of 9.4% in the total number of malignant diseases and 5.8% in total mortality caused by all malignancies in the female population [4].

The incidence of cervical carcinoma in Vojvodina is 26.6/100,000, with a clear increase in the number of patients ($r = 0.69$) [7].

The results of our investigation which refer to the distribution of patients with cervical cancer in defined groups are in accordance with the data of the SEER 9 (Cancer Statistics Review 1988-2003); we should note here that hospital and population data have been compared [13].

By following the linear trend of the number of registered cases in the group of patients with stages I-IIA for the 7-year period, no significant change in the prevalence of the disease has been observed. Although the largest absolute number of patients had early-stage disease, an important fact remains that, throughout the observed period, no decrease in the prevalence of this disease was registered.

If we take into account the fact that there are clearly defined methods of screening, aiming at prevention and early detection of cervical carcinoma, and which have greatly contributed to a considerable decrease in the incidence of this disease in the countries of western Europe, it is evident that such or similar programmes should be implemented in our country as well, because all the necessary conditions are now met so that their utilisation could be successfully carried out [14].

The importance of implementation of such programmes in Serbia is reflected in the fact that a routine gynecological check-up can undoubtedly diagnose the disease in stages when curative surgical treatment is still possible and also that treatment in advanced stages of cervical carcinoma yields clearly worse results in terms of the 5-year survival compared with stages I and IIA [15-17].

The most important fact of the present epidemiological study is the unchanged trend of the incidence of advanced disease. The 5-year survival in women with advanced disease is extremely short regardless of the therapeutic modalities used [18].

Compiled literature data confirm that several years are necessary for cervical carcinoma to proceed from premalignant and early malignant lesions to invasive disease with all its consequences [19].

Regular gynecological check-ups and the implementation of a compulsory screening programme of the female population in regions with an increasing incidence of cervical carcinoma should contribute to early detection of the disease and its efficient treatment, thus indirectly decreasing the prevalence of advanced forms of the disease.

Conclusion

The linear trend of the number of patients with cervical carcinoma during a 7-year period (2001-2007) points to the fact that the number of newly detected cases of advanced disease stages did not decrease significantly despite the affordable and simple methods of early detection. Implementing a national strategy in the fight against cervical carcinoma by following the successfully implemented programmes in some European

countries would definitely yield good results in the future. Furthermore, insisting on continuous education of gynecologists and informing the population could contribute to the improvement of the integrated management of this highly preventable disease.

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