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Antropologic Factors in Prediction of Ovary Cancer

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A B S T R A C T

The aim of the study was to determine a combination of anthropometric variables that would enable better differentiation between benign and malignant ovarian masses. Prospective study has been performed in a two year period in which 208 women with ovarian lesions were analyzed and correlated with histopathologic surgical findings. We examined the relation between self-reported anthropometric and other variables (height, weight, body mass index – BMI, parity, marital status, education, age, rural versus urban residence, menopausal status) and incidence of ovarian cancer. Age, parity, marital status and menopausal status individually showed statistical significance.

Key words: *ovary carcinoma, anthropometric variables*

Introduction

Ovarian cancer is the 6th most common form of malignancy in females, and the second of all genital tract cancer, being the highest mortality rate of all genital tract cancers. The incidence of ovarian cancer in women is 4.3%. The most common forms of malignant ovary cancer are the surface epithelial-stromal tumors that account for 80–90% of all ovarian malignancies. Risk factors for the ovarian cancer are not as clear as for other genital tumors. Some authors indicate that risk factors for ovarian cancer are: infertility, nulliparity, low parity, family history and nutrition (animal fat, proteins, galactosis, high calories)[1,2]. Some authors believe that factors like oral contraceptives, breastfeeding, vegetarian food and vitamins A and C [3] have protective role.

It would be very helpful to define the risk factors for ovarian cancer, and to determine the groups of women with higher risk of ovarian cancer. The group of women with the higher risk, would be included into more intensive screening that would give us the opportunity to discover the illness in its early stages and providing such patients an adequate treatment resulting in lower mortality. It would be beneficiary to discover the means of distinguishing the benign changes from the malignant ones so that the unnecessary invasive procedures could be avoided, resulting with preserved fertility and lowered morbidity.

Materials and Methods

We studied 208 women with ovarian tumor in the prospective study. All women were hospitalized at the University hospital »Sestre Milosrdnice« in Zagreb between January the 1st of 2001. and 31st of December 2002. All studied patients had a surgery due to the diagnosis of ovarian tumorous mass. The women were classified into the various groups according to the following factors: the environment where they lived (rural or urban area), marital status (married, single, divorced, widows), level of education (primary school-low, high school-medium, university degree-high) and the last group were the patients of reproductive age in relation to the patients in menopause.

Weight and height were measured for all women and body mass index (BMI) was calculated. We compared those parameters with final results of patohystologic tumor analysis, and observed in which groups ovary cancer occurred more often. To describe numeric variables we applied arithmetic mean, standard deviation and the median value. For description of qualitative variables we applied frequency and percentage. For the comparison of the patients with malignant or benign changes nonparametric Mann-Whitney test for numeric variables and χ^2 test for qualitative variables were applied.

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TABLE 1
THE DIFFERENCES BETWEEN THE GROUP OF PATIENTS WITH BENIGN, BORDERLINE AND MALIGNANT TUMOR OF OVARY IN CORRELATION TO AGE, HEIGHT, WEIGHT AND BODY MASS INDEX, EXPRESSED AS ARITHMETIC MEAN, STANDARD DEVIATION AND MEDIAN

	Benign tumors			Borderline tumors			Malignant tumors		
Number of patients(208)	120 (57.7%)			7 (3.4%)			81 (38.9%)		
Age*	45.40	12.68	46.00	53.14	11.63	56.00	57.12	13.28	55.00
Height (cm)	164.84	6.12	164.50	163.86	5.15	165.00	162.89	5.55	165.00
Weight (kg)	70.61	14.50	67.00	78.29	20.50	83.00	70.56	12.11	69.00
BMI (kg/m^2)	26.02	5.29	25.19	29.09	7.34	28.06	26.67	4.75	25.78

*p – 0.001 Mann-Whitney test, comparing the groups with malignant and benign tumor, BMI – body mass index

Results

208 patients with tumorous change of the ovary were analyzed, 120 (57.7%) with benign changes, 7 (3.4%) with borderline type and 81 (38.9%) with malignant ovary change. Considering the low number of the patients with borderline type of the tumor we did not consider that group statistically significant and therefore have not analyzed it further.

Regarding the age of the patients, benign tumors were found in the youngest patient group (45.4 years; 12.68 years, 46 years), the malignant change was found in the oldest patient group (57.12 years; 13.28 years; 55 years), the difference was statistically significant (p= 0.001, Table 1). We did not found significant difference between these groups regarding weight, height or BMI (Table 1). (The results are expressed as arithmetic mean, standard deviation and the median).

When considering the environmental factor we did not find statistically significant differences between our observed groups (Table 2).

TABLE 2
THE DIFFERENCES BETWEEN THE GROUPS OF PATIENTS WITH BENIGN, BORDERLINE AND MALIGNANT TUMOR OF OVARY IN CORRELATION TO ENVIROMENTAL FACTOR

The environment	Benign tumors	Borderline tumors	Malignant tumors
Urban	69 (57.5%)	6 (85.7%)	50 (61.7%)
Rural	51 (42.5%)	1 (14.3%)	31 (38.3%)

Regarding the professional qualification there were some differences between the groups. In patients with high professional qualification benign tumor was found in 19.2% (23 patients), 63.3% (76 patients) in patients with medium professional qualification and 17.5% (21 patient) with low professional qualification. At the some time in patients with malignant tumor of ovary 12.3% (10 patients) had high level of professional qualification, 59.3% (48 patients) with medium professional qualification and 28.4% (23 patients) with low professional qualification.

The difference between the groups was not statistically significant (χ^2 test), but in low professional qualification group the patients had the highest tendency for malignant illness (Table 3).

TABLE 3
THE DIFFERENCES IN PREVALENCE OF BENIGN, MALIGNANT AND BORDERLINE TUMORS ACCORDING TO LEVEL OF PROFESSIONAL QUALIFICATION IN STUDIED GROUPS

The level of professional qualification	Benign tumors	Borderline tumors	Malignant tumors
High	23 (19.2%)	1 (14.3%)	10 (12.3%)
Medium	76 (63.3%)	3 (42.9%)	48 (59.3%)
Low	21 (17.5%)	3 (42.9%)	23 (28.4%)

Regarding the marital status within the group with benign tumor 60.8% (73 patients) were married, 25.8% (31 patients) were single, 4.2% (5 patients) were divorced, and 9.2% (11 patients) were widows. Within the group of patients with malignant tumor 63% (51 patient) were married, 9.9% (8 patients) were single, 12.3% (10 patients) were divorced, and 14.8% (12 patients) were widows. There is a significant difference between the groups (p=0.007) (χ^2=12.065, df 3), and the most distinctive difference was found in the prevalence of malignant versus benign tumors between single and divorced patient groups (Table 4).

TABLE 4
THE DIFFERENCES IN PREVALENCE OF BENIGN, MALIGNANT AND BORDERLINE OVARY TUMOR ACCORDING TO MARITAL STATUS

Marital status	Benign tumors	Borderline tumors	Malignant tumors
Married	73 (60.8%)	5 (71.4%)	51 (63%)
Single	31 (25.8%)	2 (28.6%)	8 (9.9%)
Divorced	5 (4.2%)	–	10 (12.3%)
Widow	11 (9.2%)	–	12 (14.8%)

p – 0.007, (χ^2=12.065, df 3)

The difference considering menopause was also statistically significant. Prevalence of benign change was 38.3% (46 patients) in women in menopause vs. 61.7% (74 patients) in women of reproductive age. In the group of patients with malignant tumor there were 69.1% (56 patients) patients in menopause vs. 30.9% (25 patients) of reproductive age. The deviation regarding menopause in patients with malignant and benign tumor was statistically significant ($p=0.001$, $\chi^2 = 18.357$, df 1, Table 5).

TABLE 5
THE DIFFERENCES BETWEEN PATIENTS WITH MALIGNANT, BENIGN AND BORDERLINE TUMOR ACCORDING TO MENOPAUSE

Postmenopausis	Benign tumor	Borderline tumor	Malignant tumor
Yes	46 (38.3%)	4 (57.1%)	56 (69.1%)
No	74 (61.7%)	3 (42.9%)	25 (30.9%)

Discussion

Ovary cancer is frequent illness with high mortality rate. That is why it is the main object of various researches. Particularly meaningful would be to distinguish risk factors for ovary cancer enabling determination of the risk groups that require more careful monitoring and more frequent controls.

Some authors questioned the influence of smoking[4], alcohol[5], long-term consummation of coffee[5] and the influence of war[6]. Other authors found higher risk in women who worked in beauty saloons[7], dry cleaning stores[8], telephone operators and telegraphists. Rodriguez et al.[9] have found statistically significant lower mortality rate in shorter women (≤152) and higher mortality rate in taller women (≥177 cm). As obesity increases risk for some diseases[10] its connection with cancers was also investigated. Postmenopausal weight is not clearly connected the ovary cancer. Engeland et al.[11] have found positive correlation between height and ovary cancer. Woman who had high BMI in the adolescent age or early adult age had increased risk for developing illness comparing to woman with normal BMI. Such correlation has not been found in elder age groups. Kuper et al.[12] have not found significant difference in the incidence of ovary cancer regarding weight, height and BMI in their study. In premenopausal woman weight and BMI have been connected to increased risk for cancer but without statistical significance. The studies of Anderson et al.[13] and Fairfeld et al.[14] implicate that the higher BMI in younger adult age is related to higher (increased) risk for ovary cancer in pre and post menopauses. Women with increased weight in adult age do not have higher incidence of disease. These research gives us one more reason for avoiding high weight in adolescence. Maso et al.[15] have shown in their study that the weight and BMI determined a year before ovary carcinoma diagnosis have not increased the risk for developing this disease. Lukanova et al.[16] have found reversed correlation between BMI and cancer risk. This information implicate that increased BMI can be protective factor against developing ovary cancer. In our research we used current values of weight and height. Comparing BMI of patients with benign and malignant changes of the ovary we did not find any statistically significant differences from which we can conclude that BMI is not predisponant factor of benign or malignant illness. These data support the results from other studies. Considering BMI indirect measure of fatness we can conclude that the current weight of the patient has no meaning in predicting of benign or malignant change of the ovary.

Many authors researched risk factors for ovary cancer in urban-rural environment. Wronkowski et al.[17] have analyzed the incidence of ovary cancer in urban environment in Warsaw versus rural environment surrounding Warsaw. They found that the Warsaw has higher incidence of ovary carcinoma than the villages surrounding Warsaw and whole Poland. Koch et al.[18] have also shown different incidence of ovary cancer in urban and rural places but without statistical significance. Our Clinical Hospital supplies both groups of patients, the ones from rural and the ones from urban environments. We researched weather there is any difference in the incidence between malignant or benign changes of ovary considering the environmental factor. Our data have showed higher incidence of malignancy in town than in rural places but without statistical significance.

Many studies question the impact of marital status on the incidence and survival rate on patients with ovary cancer. Demopoulos et al[19]. have found that the risk of the disease is three times higher in single woman than married ones, but they pointed out that marital status is in tight connection with parity. Parity directly and with high significance has an impact to the incidence of ovary cancer.

In prospective study authors from Norway[20] have found no significant correlation between ovary cancer and birth age, menopause age or marital status. The only relevant factor was parity.

In our research, regarding marital status, we found statistically significant difference in the incidence of ovary cancer. Single women have higher incidence of benign changes on the ovaries which can be explained with the fact that the single woman are more likely younger and still not married. The distribution of data towards malignant disease in divorced women group surprised us. We assumed that the quantity of stress in lives of divorced women is higher and connected with the higher incidence of the disease.

The level of education and possible correlation with incidence of ovary cancer was the subject of research in many investigations. Faggiano et al.[21], in their multicentric study, have questioned correlation between education, socioeconomic status of patients with carcinoma and have found higher incidence of ovary carcinoma in patients with better socioeconomic status and higher level of education. Shai from New York[22] showed the op-

posite results and found the higher incidence of ovary carcinoma in patients with lower socioeconomic status and lower level of professional qualification. This results could be explained with poorer health care. Purdie et al.[23] have in large research in Australia found reversed correlation between level of professional qualification and ovary carcinoma.

In our research we did not find any statistical significance in the incidence of benign and malignant changes in comparison to high, medium and low level of professional qualification in women. Higher incidence of malignant changes were found in women with low level of professional qualification what correlates with other literature results. Increased incidence of ovary cancer in the group with low education could be explained by irregular controls therefore the benign changes more often stay unrecognized. The incidence of ovary carcinoma in postmenopausal women is significantly higher than in reproductive age[24] and is increasing with the age. It is predominantly illness of peri and postmenopausal women[25]. In our research in the group of postmenopausal women there was higher incidence of malignancy and in the premenopausal women there was higher incidence of benign changes of the ovary. The differences were statistically significant. Such results correlate with results of many authors.

The age of patients is in tight correlation with menopausal status. We found statistically significant differences in the incidence of benign and malignant changes regarding age. Benign changes were more common in younger women and the incidence of malignancy was higher in the elder age groups.

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ANTROPOLOŠKI ČIMBENICI U POJAVNOSTI RAKA JAJNIKA

SAŽETAK

Cilj rada je bio pronaći kombinaciju nekih antropoloških obilježja koja bi omogućila bolje razlikovanje benigne i maligne mase na jajniku. U dvogodišnje prospektivno istraživanje bilo je uključeno 208 žena s promjenama na jajnicima koje su ispitivane, a rezultati ispitivanja uspoređivani s histopatološkim nalazom. Ispitivali smo međusobni odnos nekih anamnestički dobivenih antropometrijskih i drugih parametara (visina, težina, indeks tjelesne mase-BMI, paritet, bračni status, naobrazba, godine, ruralno ili urbano stanište, menopauzalni status) i pojavnost raka jajnika. Godine, paritet, bračni status i menopauzalni status promatrani pojedinačno su pokazali statistički značajnu razliku.