

Influence of the War in Croatia on the Frequency of Gynecological Cancer in the University Hospital Osijek in the Period from 1985 to 2002

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ABSTRACT

The aim of this study is to estimate the influence of war in Croatia on the frequency of gynecological cancer (cancer of corpus and cervix uteri and ovary) in the Clinical Hospital Osijek, particularly the relation between the pre-war and post-war period. We analyzed 1455 patients with corpus uteri and cervix uteri cancer and ovarian cancer treated in the Clinical Hospital Osijek in the period 1985–2002 (group I). Patients from Osječko-Baranjska County were analyzed separately – 1273 women, (group II) and in the group III there were 182 patients from other counties. The analyzed period was divided into: pre-war 1985–1990, war 1991–1993 and post-war period 1997–2002. In all three groups the number of patients treated for gynecological cancer was significantly larger in the post-war period (group I, N=611, group II, N= 498, group III, N=113) than in the pre-war period (group I, N=457, group II, N= 433, group III, N=24) The analysis of cancer frequency in relation to the site shows that a total number of patients treated for cervical cancer was larger in the post-war (N=229) than in the pre-war period (N=214), but the difference wasn't significant. However, the number of patients from Osječko-baranjska County treated for cervical cancer was larger in the pre-war (N=207) than in the post-war period (N=178) but still, the difference wasn't significant. The number of patients treated for corpus uteri cancer and ovarian cancer was significantly larger for the I group in the post-war (N=225 and N=157 respectively) than in the pre-war period (N=136, and N=107 respectively). In the group II the number of patients treated for corpus uteri cancer and ovarian cancer was larger in the post-war (N=196 and N=124 respectively) than in the pre-war period (N=130 and N=96 respectively) but the difference was significant only for corpus uteri cancer. Significantly more women were treated for gynecological cancer in the post-war than in the pre-war period. However, the war had probably an indirect influence on the increased number of patients treated for gynecological cancer mainly because many more women arrived from other counties.

Key words: gynecological cancer, frequency, war, Croatia

Introduction

Malignoma of the cervix, corpus uteri and ovary are 90% of malignant tumors of gynecological organs. In relation to frequency they are the third most common malignancies in women after breast cancer and colorectal cancer¹.

In Western European countries screening program has contributed to the decrease of incidence and mortality of cervical cancer in the last fifty years^{2–4}. Incidence of ovarian cancer is either slightly increasing or stable^{6,7}. In recent years in the developed countries corpus uteri cancer and ovarian cancer have either decreased or been stable³. According to the Statistics, Epidemiol-

ogy and End Results (SEER) program of the National Cancer Institute the incidence of cervical cancer in the USA for the period identical to ours is decreasing whereas the incidence of corpus uteri cancer is stable and ovarian cancer is increasing.

In some developing countries cervical cancer is decreasing and in others it is stable, but still the first most common malignancy of gynecological organs in relation to frequency in spite of the increase in incidence of corpus uteri cancer^{8–10}. Ovarian cancer is increasing in some developing countries and in others it remains stable^{8,10}.

The aim of this study was to analyze possible influence of the war in Croatia on the frequency of the most common sites of gynecological cancers (corpus and cervix uteri cancer and ovarian cancer) in the Clinical Hospital Osijek.

Patients and Methods

Patients treated for the most common in gynecological cancers (corpus and cervix uteri, ovarian cancer) in the Gynecological Department of the Clinical Hospital Osijek 1984–2002 were analyzed retrospectively. As cervix uteri, corpus uteri and ovarian cancers are 90% of all malignant gynecological tumors in the text to follow we don't refer to them separately, but we use common term: gynecological cancer.

Our aim was to analyze the influence of war to the incidence of gynecological cancer. The whole period was divided into three subperiods of six years: pre-war period 1985–1990, war period 1991–1996 and post-war period 1997 (it was the year when the displaced started returning back to their homes in the occupied areas as well) – 2002. In order to consider all the other factors, which could influence distribution of frequency of gynecological cancer, we divided a total number of patients into three groups. In the first group (group I) 1455 patients treated for gynecological cancer were analyzed. In the second group (group II) only those living in the area of Osječko-baranjska County (N=1273) were analyzed and in the third one (group III) patients who had arrived from other counties (N=182).

In the Osječko-baranjska County lived 189,000 women, according to the census from 1991. According to the last census from 2001, in this area live 171,829 women. In this county there is still one smaller hospital, but almost all women with genital cancer have been treated in Clinical hospital Osijek.

The analyses included only primary, newly discovered (first occurrence) malignant invasive tumors. All cases were histologically verified.

During the whole-analyzed period, a screening program for cervical cancer was performed.

The data for analyses were gathered from the case histories of the Gynecological Department and statistical data of the Public Health Institute.

For statistical analysis we used χ^2 with Yates's correction.

Results

The classification of women according to disease stage (Figo), shows that there are more cancer cases detected in the first stage, but less cases of cervix or ovary cancer in advanced stages (II, III, IV) in the post war period in comparison to pre or war period. However, the incidence of uterus corpus cancer in its advanced stage increased in the post war period (Table 1).

The mean age of the women treated for genital cancer (cervix, corpus, and ovary) was 58.6 years. The mean age of the women with cervical cancer was 54.4 years, with uterus corpus cancer 63.7 and of those with ovary cancer 57.0 years.

Speaking of cervical cancer incidence for certain age group, we could see that highest one was in the women of 54 to 64 years old. In the war period the cervical cancer incidence was the highest in the women of 45 to 54, but in the post war period it was in the women from 35 to 44 (Table 2).

In the pre war period the incidence of uterus corpus cancer was the highest in the women from 55 to 64 and in the war period and post war period in the women of 65 to 74 (Table 3).

The ovary cancer incidence was high in all three periods among the women of 55 to 64 (Table 4).

The number of all women treated for gynecological cancer (group I) is significantly larger in the post-war (N=611) than in the pre-war period (N=455, $\chi^2=21.919$, $\chi^2_{0.05}=3.841$). Analysis of cancer frequency, by site, shows increase of all three cancer types in the post-war period (N=229, N=225 and N=157) if compared to the pre-war period (N=214, N=316 and N=107) but the difference is significant only for corpus uteri cancer and ovarian cancer ($\chi^2=21.452$ and $\chi^2=9.095$, $\chi^2=3.841$ respectively) but it is not significant for cervix uteri cancer ($\chi^2=0.442$,

TABLE 1
DISTRIBUTION OF THE WOMEN WITH GENITAL CANCER ACCORDING TO STAGE (FIGO) IN THE ANALYZED PERIODS

Site of the genital cancer	Stage	Periods			
		1985–1990 N (%)	1991–1996 N (%)	1997–2002 N (%)	1985–2002 N (%)
Cervix	I	84 (39.3)	56 (39.4)	114 (54.0)	254 (44.8)
	II,III,IV	130 (60.7)	86 (60.6)	97 (46.0)	313 (55.2)
Corpus	I	107 (80.5)	98 (77.8)	140 (72.9)	345 (76.5)
	II,III,IV	26 (19.5)	28 (22.2)	52 (27.1)	106 (23.5)
Ovaries	I	25 (27.8)	35 (41.2)	57 (39.6)	117 (44.7)
	II,III,IV	65 (72.2)	50 (58.8)	87 (60.4)	145 (55.3)
Total	I	216 (49.4)	189 (53.5)	311 (56.9)	716 (53.6)
	II,III,IV	221 (50.6)	164 (46.5)	236 (43.1)	621 (46.4)

TABLE 2
DISTRIBUTION ACCORDING TO AGE OF ALL WOMEN TREATED FOR CERVICAL CANCER IN THE ANALYZED PERIODS

Age groups	Periods				
	1985–1990	1991–1996	1997–2002	1985–2002	
<34	N	23	11	24	58
	%	10.7	7.3	10.5	9.9
35–44	N	34	24	56	114
	%	15.9	16.7	24.5	19.5
45–54	N	49	37	48	134
	%	22.9	26.0	21.0	22.9
55–64	N	57	33	37	127
	%	26.6	23.3	16.1	21.7
65–75	N	37	23	37	97
	%	17.3	16.7	16.1	16.6
>75	N	14	14	27	55
	%	6.5	10.0	11.8	9.4
Total	N	214	142	229	585
	%	99.9	100.0	100.0	100.0

TABLE 4
DISTRIBUTION ACCORDING TO AGE OF ALL WOMEN TREATED FOR OVARY CANCER IN THE ANALYZED PERIODS

Age groups	Periods				
	1985–1990	1991–1996	1997–2002	1985–2002	
<34	N	5	7	7	19
	%	4.5	7.2	4.6	5.3
35–44	N	17	14	11	42
	%	16.2	15.5	7.5	11.7
45–54	N	22	19	35	76
	%	20.7	20.6	22.0	21.2
55–64	N	27	34	48	109
	%	25.2	36.1	30.1	30.4
65–74	N	27	16	39	82
	%	25.2	16.5	24.8	22.9
>75	N	9	4	17	30
	%	8.1	4.1	11.0	8.4
Total	N	107	94	157	358
	%	99.9	100.0	100.0	99.9

$\chi^2_{0.05}=3.841$). In the war period, if compared to the pre-war period, there was an increase in corpus uteri cancer whereas the incidence of cervix uteri and ovarian cancer decreased (Table 2, 3 and 4).

If we divide the war period into two subperiods (1991–1993 and 1994–1996) then the analyzed number of patients treated for gynecological cancer shows that in 1991–1993 there was a decrease in total number of cancers (N=172). By site: cervix uteri (N=73), corpus uteri (N=63) and ovarian cancer (N=36). In the period 1994–1996, however, the number of patients treated for gynecological cancer increased (N=215). By site: corpus uteri (N=88), ovarian cancer (N=58) whereas the number of women treated for cervix uteri cancer was slightly decreasing (N=69).

TABLE 3
DISTRIBUTION ACCORDING TO AGE OF ALL WOMEN TREATED FOR CANCER OF THE CORPUS UTERI IN THE ANALYZED PERIODS

Age groups	Periods				
	1985–1990	1991–1996	1997–2002	1985–2002	
<34	N	0	1	2	3
	%	0	0.7	0.9	0.6
35–44	N	2	9	6	17
	%	1.5	5.9	2.7	3.3
45–54	N	33	19	23	75
	%	24.1	12.6	10.2	14.6
55–64	N	50	52	72	174
	%	36.8	34.4	32.0	34.0
65–74	N	37	56	81	174
	%	27.1	37.1	36.0	34.0
>75	N	14	14	41	69
	%	10.5	9.3	18.2	13.5
Total	N	136	151	225	512
	%	100.0	100.0	100.0	100.0

TABLE 5
DISTRIBUTION OF WOMEN FROM OSJEČKO-BARANJSKA COUNTY TREATED FOR GYNECOLOGICAL CANCER IN THE ANALYZED PERIODS

Site of genital cancer	Periods				
	1985–1990	1991–1996	1997–2002	1985–2002	
Cervix	N	207	125	178	510
	%	40.6	24.5	34.9	100.0
Corpus	N	130	141	196	467
	%	27.8	30.2	42.0	100.0
Ovaries	N	96	76	124	296
	%	32.4	25.4	41.3	100.0
Total	N	433	342	498	1273
	%	34.0	26.9	39.1	100.0

The number of women in Osječko-baranjska County (group II) treated for gynecological cancer is also significantly larger in the post-war (N=498) than in the pre-war period (N=433, $\chi^2=4.400$, $\chi^2=3.841$). However, the analyses of the frequency of cancer by site shows that the number of women treated for cervix uteri cancer was larger in the pre-war (N=207) than in the post-war period (N=178) but the difference wasn't significant as well ($\chi^2=2.036$, $\chi^2=3.841$). The above result is completely opposite in relation to the group I. The number of women treated for corpus uteri cancer and ovarian cancer was, like in the group I, larger in the post-war (N=196, or N=124 respectively) than in the pre-war period (N=130, or N=96 respectively) but the difference is significant only for corpus uteri cancer ($\chi^2=12.960$, $\chi^2=3.841$) but not for ovarian cancer ($\chi^2=3.314$, $\chi^2=3.841$). The proportion of women treated in the pre-war and war period was similar to the proportion in the group I (Table 5).

Figure 1 shows a linear trend of gynecological cancer rate in Osječko-baranjska County by years. It shows, similar to the analysis by six-year periods, that the rate

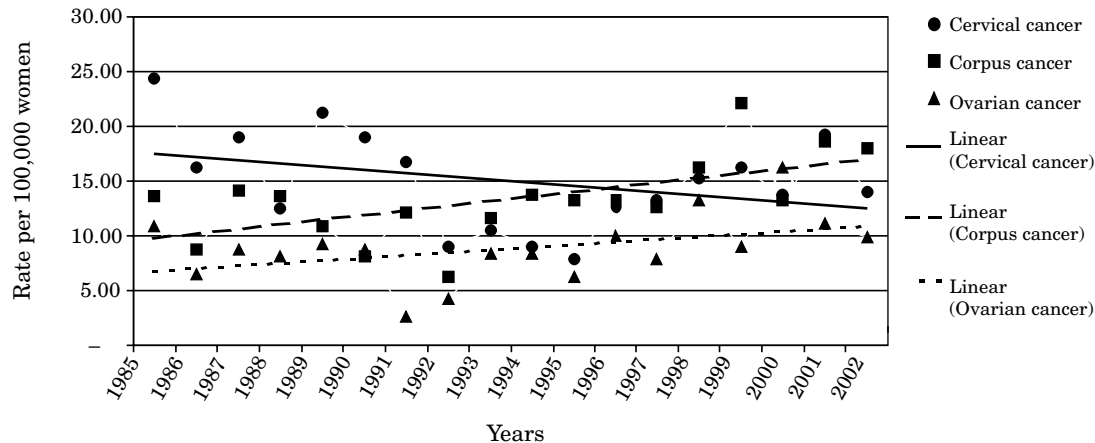


Fig. 1. Distribution by years and linear trend of cervix uteri cancer, corpus uteri cancer and ovarian cancer in Osječko-baranjska county.

TABLE 6
DISTRIBUTION OF WOMEN OUTSIDE OSJEČKO-BARANJSKA COUNTY TREATED FOR GYNECOLOGICAL CANCER IN THE ANALYZED PERIOD

Site of genital cancer	Periods				
	1985–1990	1991–1996	1997–2002	1985–2002	
Cervix	N	7	17	51	75
	%	9.3	22.7	68.0	100.0
Corpus	N	6	10	29	45
	%	13.3	22.2	64.4	99.9
Ovaries	N	11	18	33	62
	%	17.7	29.0	53.2	99.9
Total	N	24	45	113	182
	%	13.2	24.7	62.1	100.0

of cervix uteri was decreasing in the analyzed period, whereas corpus uterus and ovarian cancer rate was increasing.

The number of women outside Osječko-baranjska County (III group) treated for gynecological cancer was also significantly larger in the post-war (N=113) than in the pre-war period (N=24, $\chi^2=56.526$, $\chi^2=3.841$) The number of all three cancer types is significantly larger in the post-war (N=51 and N=29, N=33 respectively) than in the pre-war period (N=7, N=6, N=11, $\chi^2=31.879$ and $\chi^2=13.829$ and $\chi^2=10.023$, $\chi^2=3.841$, Table 6).

Discussion

War is the time of migrations and decrease in social and economic conditions in the war affected areas¹¹. Consequently, health care in those areas declines, which refers most to PAD of prevention^{12,13}. Besides, war-suffering stress influenced by war, influence the immunity system. All these factors influence an extraordinary increase in some illnesses, among which cancer as well, in the post-war period.

The results analysis of genital cancer incidence according to age shows an increase tendency of cervical

cancer in younger women in the post war period. The incidence of corpus cancer and ovary has not changed in the observed periods.

We cannot see clearly the negative influence of the war on the genital cancer distribution according to the disease stage because the incidence of the cervix and ovary cancer cases in the early stage has increased in the post war period but the incidence of the advanced stage of corpus cancer has only slightly increased.

Relationship of incidence of gynecological cancer in the pre-war and war period shows that a total incidence of the cancer was significantly lower in the war period, which was to be expected due to migration. Furthermore the part of Osječko-baranjska County was occupied (Baranja). However, if we analyze cancer by site, then an expected decrease in frequency of cervix uteri and ovarian cancer is noticeable in the war period compared to the pre-war period. On the other hand, an unexpected increase in frequency of corpus uteri cancer was noticed. In order to explain that illogical frequency of corpus uteri cancer we divided the war period in Osječko-baranjska and Vukovarsko-srijemska County (1991–1996), by aggression intensity, into two sub-periods. The first period was the time of intensive war devastation 1991–1993. In that period the incidence of all three-cancer types was decreasing, both in total number and by site. The reason for that was probably a mass migration of female population from this area to other parts of the country or abroad. During the second period, 1994–1996, the war was over and a certain number of women returned, but not all of them as big areas of Osječko-baranjska County were still occupied. Moreover, population in that area changed significantly due to the fact that a large number of people didn't return at all and those coming from other areas affected by war inhabited the area. In that period the frequency of cervix uteri cancer was decreasing, but the corpus uteri cancer and ovarian cancer started to increase.

Relationship of the frequency of gynecological cancers between the war and postwar period was expected so that the total and individual frequency of the cancer was significantly higher than in the post-war period.

The relationship between the pre- and post-war period was of special interest in the analysis of the frequency of the gynecological cancer. A significantly higher frequency of gynecological cancer in the post-war period was proved. When we analyzed the cancer frequency separately, by site, we found that the frequency of all types of cancer was higher in the post-war period, but the difference is significant only for corpus uteri cancer and ovarian cancer.

It is possible that such a distribution of the frequency of gynecological cancer was influenced indirectly by war. The hospitals in the war affected areas of Osječko-baranjska and Vukovarsko-srijemska County were also devastated. General hospitals in Vukovar and Vinkovci were more severely devastated than the Clinical Hospital in Osijek, so that most of the patients from that area were treated in the Clinical Hospital Osijek in the post-war period. Therefore, the frequency of gynecological cancer in patients from Osječko-baranjska County and other areas was analyzed separately. In patients from Osječko-baranjska County the total frequency of gynecological cancer was significantly higher in the post-war than in the pre-war period. That also refers to corpus uteri cancer and ovarian cancer. On the other hand, the frequency of cervix uteri cancer was higher in the pre-war period, but the difference wasn't significant, which is completely opposite to the results of the analysis of all treated patients. In order to check additionally, we separately analyzed a linear trend of new cases of

gynecological cancer in Osječko-baranjska County by years. The results show that there is a trend of decrease in incidence of cervix uteri cancer and increase in incidence of corpus uteri and ovarian cancer in the analyzed period. Similar results have other developing countries as well¹⁰.

The frequency of women from other areas was significantly higher both total and separate, by site, in the post-war than in the pre-war period.

In conclusion, the total number of women treated for gynecological cancer increased significantly in the post-war in relation to the pre-war period. However, the analysis by site shows increase only in corpus uteri and ovarian cancer, whereas cervix uteri cancer decreased in frequency. It is noticeable that women who arrived from other war affected areas to be treated in Osijek influenced the frequency of certain cancer types. Therefore we think that the results haven't confirmed the hypothesis that the war directly influenced increase in the frequency of gynecological cancer. On the contrary, increase in the frequency of gynecological cancer was influenced by a larger number of women from other counties and our results are typical for the usual distribution of cancer frequency in developing countries.

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UTJECAJ RATA U HRVATSKOJ NA UČESTALOST RAKA ŽENSKIH SPOLNIH ORGANA U KLINIČKOJ BOLNICI OSIJEK U RAZDOBLJU OD 1985. DO 2002. GODINE

SAŽETAK

Cilj ovog rada je procijeniti utjecaj rata u Hrvatskoj na učestalost raka ženskih spolnih organa (raka vrata maternice, trupa maternice i jajnika) u Kliničkoj bolnici Osijek, posebno odnos između prije i poslijeratnog razdoblja. Obradeno je 1455 žena s rakom cerviksa, korpusa i jajnika liječenih u Kliničkoj bolnici Osijek u razdoblju od 1985 do 2002 godine (I skupina). Posebno su obrađene 1273 liječene žene iz Osječko-baranjske županije (II skupina) a posebno 182 žene iz drugih županija (III skupina). Analizirano razdoblje je podijeljeno na: prijeratno razdoblje od 1985 do

1990 godine, ratno razdoblje od 1991 do 1996 godine i poslijeratno razdoblje od 1997 do 2002 godine. U sve tri skupine broj žena liječenih zbog raka spolnih organa bio je značajno veći u poslijeratnom (I skupina: N=611, II skupina: N=498, III skupina: N=113) nego u prijeratnom razdoblju (I skupina: N=457, II skupina: 433, III skupina: N=24). Analizom učestalosti raka po lokalizacijama vidi se da je ukupan broj žena liječenih zbog raka cerviksa uterusa bio veći u poslijeratnom (N=229) nego u prijeratnom razdoblju (N=214) ali ta razlika nije bila značajna. Međutim, broj žena iz Osječko-baranjske županije liječenih zbog raka cerviksa bio je veći u prijeratnom (N=207) nego u poslijeratnom razdoblju (N=178) ali razlika također nije bila značajna. Broj žena liječenih zbog raka korpusa uterusa i jajnika bio je za I skupinu ispitanica značajno veći u poslijeratnom (N=225 odnosno N= 157) nego u prijeratnom razdoblju (N=136 odnosno N=107). U II skupini ispitanica broj žena liječenih zbog raka korpusa i jajnika bio je veći u poslijeratnom (N=196 odnosno N=124) nego u prijeratnom razdoblju (N=130 odnosno N=96), ali je razlika značajna samo za rak korpusa. Od raka spolnih organa liječeno je značajno više žena u poslijeratnom nego u prijeratnom razdoblju. Međutim, rat je vjerojatno samo indirektno utjecao na povećanje broja žena liječenih zbog raka spolnih organa i to zbog povećanog broja žena iz drugih županija.