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Gynecological cancer: Evolution of its relative frequency

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Abstract

Objective: *The objective of the study was to show the relative frequency of gynecological cancers at an oncology unit comparing these results with two previous studies, by highlighting the increase in the number of uterine cancers.* **Materials and methods:** *Review the number of cases of gynecological cancers at the Oncology Service of the General Hospital of Mexico from 2016 to 2017, comparing it with two previous periods, 1983-1984 and 2010-2011.* **Results:** *We included 931 patients with gynecological cancers, 427 patients with cervical cancer (45.8%), 274 patients with uterine cancer (29.4%), and 206 patients with ovarian cancer (22.1%). When comparing these results with the previous ones, we found that the numbers of cervical cancer decreased from 86.8% to 57.8% to 45.8 % ($p < 0.05$); uterine cancer from 4.5% to 17.9% to 29.4% ($p = 0.0001$); and ovarian cancer from 6.2% ($p < 0.05$) to 19.7% ($p = 0.185$). The larger histological group for cervical cancer is adenocarcinomas (18.1%) and the main histology in uterine cancers is endometrial (86.8%). From this total, 71.4% patients are either overweight or obese. About 63.9% of cases were diagnosed as late-stage cancers.* **Conclusions:** *In this series, we detected a decrease in the frequency of cervical cancers, with adenocarcinomas increasing in percentage, and a significant increase in uterine cancers associated with overweightness and obesity. Advanced stages of gynecological cancers were prevalent.*

Key words: *Gynecological. Cancer. Relative. Frequency. Evolution.*

Introduction

Cervical cancer is a public health problem in developing countries because it is often diagnosed in already advanced stages and presents the highest mortality rate among gynecological cancers[1,2]. Conversely, in recent years, the frequency of uterine cancer linked to metabolic syndrome and obesity is on the rise[3,4].

The World Health Organization estimated that by 2018, there would be 190,667 new cases of cancer in Mexico, of which 105,051 (50.9%) cases would be affecting women. In relation to this total, 20,570 (19.5%) cases occurred in the reproductive tract with 7869 cases of cervical cancer (38.2%), 7266 (35.3%) cases of uterine cancer, 4759 (23.1%) cases of ovarian cancer, 422 (2.0%) cases of vulvar cancer, and 254 (1.2%) cases of vaginal cancer[5].

This article shows the relative frequency of cancers of the female reproductive tract in a high-specialty cancer center for the period 2016-2017. Some of this data is compared with data published in two previous periods. The increase in the number of uterine cancers was highlighted and conclusions were drawn accordingly.

Materials and methods

During the period 2016-2017, 2185 patients were attended at the Gynecological Tumor Unit of the Oncology

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Table 1. Gynecological cancer. Relative frequency and age ranges

Neoplasm	Number of patients	Percentage	Age (minimum-maximum)*	Average age*
Cervical cancer	427	45.6	22-92	50
Uterine cancer	274	29.2	29-85	55
Ovarian epithelial cancer	206	22.0	21-83	47
Vulvar cancer	22	2.3	37-90	68
Trophoblastic tumors	5	0.5	18-40	29
Vaginal cancer	2	0.2	42-68	56
Total	936	99.8	-	-

*In years.

Table 2. Gynecological cancer. Relative frequency in different periods

Neoplasm	(I) 1983-1984		(II) 2010-2011		(III) 2016-2017		Significance
	Number	%	Number	%	Number	%	
1. Cervical cancer	727	86.8	632	57.8	427	45.8	I vs.II $p < 0.05$
2.Uterine cancer	38	4.5	197	17.9	274	29.4	I vs. II $p < 0.05$
3. Ovarian epithelial cancer	52	6.2	213	19.7	206	22.1	I vs. II $p < 0.05$
4. Vulvar cancer	16	1.9	22	2.0	22	2.3	I vs.II $p = 0.845$
5. Vaginal cancer	4	0.4	16	1.4	2	0.2	I vs.II $p = 0.032$
Total	837	99.8	1,080	99.8	931	99.8	

1: II) versus (III) $p < 0.05$; 2: (II) versus (III) $p = 0.0001$; 3: (II) versus (III) $p = 0.185$; 4: (II versus III) $p = 0.618$; 5: (II) versus (III) $p = 0.003$.

Service at the General Hospital of Mexico "Dr. Eduardo Liceaga." 1066 patients received a histopathological diagnosis of gynecological cancer: cervical, uterine, ovarian, vulvar, vaginal, and trophoblastic tumors.

According the respective medical records, information was obtained related to the frequency of each neoplasm, patients' age, histopathological varieties, and classification according to that of the International Federation of Gynecology and Obstetrics in its 2009 version[6,7]. For uterine cancers, the body mass index (BMI) was investigated, considering a BMI of 25-29.9 as overweightness and a BMI of 30.0-50 or more[8] as obesity. The results obtained regarding the relative frequency of neoplasms and the clinical classification for cervical cancer were compared to those results reported in the previous publications for the years 1983-1984 and 2010-2011[9,10]. These results were subjected to statistical analysis using the Epi-Info™ 6.04d system.

Results

During the period analyzed, 1026 patients were treated. Ninety (8.7%) cases corresponded to high-grade intraepithelial neoplasia (CIN 3): eighty-six cases corresponded to cervical cancer, two cases corresponded to vulvar cancer, and two cases to vaginal cancer. The relative frequency and age ranges for invasive cancers are shown in table 1. The average age for invasive cervical cancers was 50 years, 55 years for uterine cancers, and 47 years for ovarian epithelial cancer.

The relative frequency of gynecological cancers in three different periods (1983-1984, 2010-2011, and 2016-2017) is shown in table 2. The decrease in the frequency of cervical cancers among invasive cancers is highlighted, which represented 86.8% of neoplasms in 1983-1984 and 45.8% in 2016-2017 ($p < 0.05$). In addition, the increase in the frequency of uterine cancers was evident between the period 2010-2011 (17.9%)

Table 3. Gynecological cancer 2016-2017. Clinical stage and number of patient ratio

Clinical stage	Cervical*		Uterine**		Ovarian		Vulvar***		Vaginal****		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
I	91	24.5	141	58.2	65	31.4	7	31.8	-		304	36.0
II	116	31.2	28	11.5	4	1.9	1	4.5	-		149	17.6
III	91	24.5	46	19.0	100	48.5	7	31.8	1	50.0	245	29.0
IV	73	19.6	27	11.1	37	17.9	7	31.8	1	50.0	145	17.2
Total	371	99.8	242	99.8	206	99.7	22	99.9	2	100	843	99.8

CIN 3: 86/513: 16.7%). No classifiable: 56/513: (10.9%). **No. Classifiable: 32/274: (13.2%). *** No classifiable:2/24 (8.3%). ****VAIN 3: 2/4: 50%.
*CIN 3: cervical intraepithelial neoplasia Grade 3. ****VAIN 3: vaginal intraepithelial neoplasia Grade 3.

Table 4. Cervical cancer. Comparative study of its frequency in three different periods

Clinical stage	(I) 1983-1984		(II) 2010-2011		(III) 2016-2017		Significance
	No.	%	No.	%	No.	%	
(a).I	104	15.8	219	35.5	91	24.5	I versus II $p < 0.05$
(b).II	270	41.1	190	31.0	116	31.2	I versus II $p = 0.0001$
(c).III	214	32.6	144	23.3	91	24.5	I versus II $p = 0.0002$
(d).IV	68	10.3	63	10.2	73	19.6	I versus II $p = 0.9352$
Total	656	99.8	616	99.9	371	99.8	

a: (II) versus (III) $p = 0.0003$; b: (II) versus (III) $p = 0.945$; c: (II) versus (III) $p= 0.738$; d: (II versus III) $p= 0.00004$.

and also the period 2016-2017 (29.4%), $p \leq 0.0001$. This situation led to its rising from third in the period 2010-2011 to the second position for the period 2016-2017. As presented in table 3, 63.9% of patients in the overall series had advanced neoplasms, (Stages II-IV). The figure includes 75.3% of invasive cervical cancers, 41.6% of uterine cancers, 68.3% of ovarian epithelial cancers, and 68.1% of vulvar cancers.

Cervical cancer

A total of 513 patients were treated, of these 86 with CIN1 (16.7%) and 427 (83.2%) with Invasive cancer (Table 3). As for histological variants, 419 patients (81.6%) presented epidermoid carcinomas; 93 patients (18.1%) had adenocarcinomas; and one patient (0.1%) developed a neuroendocrine carcinoma.

The relative frequency of clinical stages during the analyzed periods is displayed in table 4. It highlights the decrease in the number of patients treated in the period 2016-2017 in relation to the two previous periods. The decrease in Stage I care in the period 2016-2017 in relation to the period 2010-2011, ($p = 0.0003$); and the increase in Stage IV frequency observed for the last period: seventy-three cases for 2016-2017 (19.6%) versus 63 cases for 2010-2011 (10.2%) ($p = 0.00004$).

About 62.4% of the total patients treated hailed from the countryside, 44.5% from the State of Mexico, and the remainder mainly from the States of Veracruz (7.2%), Hidalgo (2.4%), Oaxaca and Guerrero (1.8% respectively), Morelos (1.5%), and Michoacán (0.6%).

Uterine cancer

274 patients with malignant uterine tumors were treated, of which 250 cases (91.2%) corresponded to carcinomas and 24 cases (8.7%) to sarcomas. Among the carcinomas, endometrial carcinoma occurred in 217 patients (86.8%) being the most frequent type of carcinoma. 155 of these patients (71.4%) were overweight or obese. The other cases consisted of 15 (6%) cases of uterine papillary serous carcinoma; 10 (4.0%) cases of clear-cell carcinoma; 6 (2.4%) cases of carcinosarcoma; 1 (0.4%) case of adenosquamous carcinoma, and 1

(0.4%) case of neuroendocrine carcinoma. The latter case involved a 59-year-old patient with an initial diagnosis compatible with carcinosarcoma, who underwent surgery and was classified as stage IIIC2. The immunohistochemistry study established the diagnosis of neuroendocrine carcinoma. The patient received radiotherapy and started with platinum-based chemotherapy in combination with etoposide. Four months after diagnosis, a positron emission tomography-computed tomography scan showed multiple mediastinal and bone metastases. The patient died 6 months later.

Regarding the group of sarcomas, leiomyosarcoma appeared as the most frequent with 13 cases (54.1%). It was followed by endometrial stromal sarcoma with nine cases (37.5%) and adenosarcoma with two cases (8.3%).

Regarding clinical classification, 58.2% of cases (141 patients) were classified as Stage I. Seventy-three patients (30.1%) were classified as Stages III and IV (Table 3). Ninety-five (67.4%) out of 141 carcinomas classified as Stage I, corresponded to Stage Ia and 46 cases (32.5%) corresponded to Ib. As for 46 cases classified as Stage III, nine (19.5%) cases showed adnexal metastases (Stage IIIa), nine (19.5%) cases showed parametrial invasion and/or vaginal metastases (Stage IIIB), and 28 (60.8%) cases showed metastases to regional lymph nodes (Stage IIIc). Regarding the latter, 17 (60.8%) cases were related to pelvic lymph nodes (Stage IIIc1) and 11 (39.2%) cases were related to the para-aortic lymph nodes.

Ovarian cancer

246 cases were recorded, of which 206 (83.7%) cases were epithelial neoplasms (Table 5): 110 (53.3%) cases of serous carcinoma, 42 (20.3%) cases of endometrioid carcinoma, 25 (12.1%) cases of mucinous carcinoma, 16 (7.7%) cases of clear-cell carcinoma, and 13 (6.3%) undifferentiated cases.

Twenty-three (9.3%) cases corresponded to germ cell tumors; regarding this total, 11 (47.6%) cases corresponded to dysgerminomas, 8 (34.7%) cases of immature teratoma, 3 (13.0%) cases of mixed carcinoma, and 1 (4.3%) case of choriocarcinoma. Seventeen patients were diagnosed with stromal tumors: 11 (64.7%) cases of granulosa cell tumors and 6 (35.2%) cases of Sertoli-Leydig cell tumors.

About 63.5% of epithelial tumors were classified as Stages III and IV, and 47.3% of germ-cell tumors were classified as Stage I. The relationship between histological grade and clinical stages is shown in table 6.

Table 5. Ovarian tumors

Histopathology	Number of cases	Percentage
Epithelial	206	83.7
Germ cell	23	9.3
Stromal	17	6.9
Total	246	99.9

Discussion

Although a decrease in the number of cervical cancers had already been reported in our Health Centre for 2010-2011: (57.8%)[10] in relation to those published for 1983-1984[9], (86.8%), ($p < 0.05$); there was a significant decrease for the period 2016-2017: 57.8% vs. 45.8% ($p < 0.05$). However, this disease still ranks high among the leading causes of gynecological cancer admissions in hospitals and health units that serve low-income people in need of social security protection. It is likely that this decrease is related to more efficient health screening services for the disease[11] and an increase in coverage for its treatment, as the federal government of Mexico has implemented a free cancer care program since 2004.

Unfortunately, advanced clinical stages of the disease still predominate, because more than 60% of the population that pursues medical treatment at the General Hospital of Mexico "Dr. Eduardo Liceaga," hails from the countryside, where the necessary infrastructure for the comprehensive treatment of this type of cancer is not available[12].

The increase in frequency, reported at the General Hospital of Mexico "Dr. Eduardo Liceaga", regarding uterine cancer from 2010 to 2011[10] compared to that observed in the years 1983-1984[9]: was 17.9% versus 4.5% and a rise of 29.4% in the numbers of this disease for the years 2016 and 2017, placing it second amongst all other gynecological cancers. In contrast, ovarian cancer has gone from 2nd to 3rd place.

We associate this change in the epidemiology of the neoplasms with the increase in obesity in recent years[1,4]. These pathologies increased from 1975 to 2014, going from 12% to 33% in China and 39.5% to 64% in Iran. In the US and Mexico, these numbers exceed 60% for women over the age of 18[1].

There is evidence that endocrine and nutritional lifestyle factors influence the origin of 5% of cancers in women worldwide, including uterine, ovarian, and

Table 6. Ovarian tumors. Clinical stage relationship with different histological types

Clinical stage	Epithelial*		Germ cell**		Stromal		Total	
	No.	%	No.	%	No.	%	No.	%
I	51	24.7	9	47.3	14	82.3	74	33.4
II	3	1.4	2	10.5	1	5.8	6	2.7
III	94	45.6	6	31.5	-	-	100	45.2
IV	37	17.9	2	10.5	2	11.7	41	18.5
Total	206	99.7	19	99.8	17	99.8	221	99.8

*Borderline tumors: 21/206 (10.1%); **No classifiable: 4/23 (17.3%).

breast cancer[4]. Obese premenopausal and postmenopausal women are far more likely to develop type I endometrial cancer (up to 40%), which is of good prognosis, rather than type II, which is not associated with overweightness and obesity. In addition, type II endometrial cancer has a less favorable prognosis[4,13]. About 86.8% of the cases presented in this series developed type I endometrial cancer and 71.4% of these patients were overweight or obese.

The National Institute of Public Health in Mexico published in 2018 that in the past three decades, the prevalence of overweightness and obesity in Mexican children and adults has increased. At present, Mexico is one of the two countries with the highest prevalence of obesity in the world[14]. In 2016, the prevalence of overweightness in adults aged 20 years or older was 72.5%[14].

Several studies have been published reporting that overweightness and obesity significantly increase the risk of developing ovarian epithelial cancer[4] as well as endocervical and adenosquamous epithelial carcinoma[15]. According to information provided by the Institute of Public Health[14], this would justify the increase observed from 6.2% to 22.1% in ovarian epithelial cancers[9,10] and 11%[15] to 18% in the numbers of cervical adenocarcinomas reported herein. These factors could also have influenced the presentation of a lower age for ovarian epithelial cancer (47 years) in relation to that of 60 years and older referred to in the literature[16-18]. This observation would also apply to the age of 55 years reported here for uterine cancers[8,13].

As for the patient with neuroendocrine carcinoma of the endometrium reported here, which represented 0.4% of the frequency for this site, very few follow-up cases without tumor activity have been reported, which globally do not exceed 30% at 5 years.

In relation to vulvar, vaginal and trophoblastic tumors, their numbers in terms of frequency and age have remained unchanged in recent years, except for vaginal cancer, whose numbers have decreased from 1.4% to 0.2% ($p = 0.003$) and for trophoblastic tumors where there was also a decrease from 1.3%[8] to 0.5%.

Conclusions

The frequency of invasive cervical cancer in relation to other cancers has decreased from 57.8% in the years 2010-2011 to 45.8% for the period 2016-2017. The frequency of cervical adenocarcinoma increased from 11% observed in the period 2005-2008 to 18% for the period 2016-2107.

The frequency of ovarian and uterine cancers increased from 19.7% and 17.9% in the period 2010 to 2011, to 22.1% and 29.4%, respectively for the years 2016 to 2017. The age of 47 and 55 years shown for these tumors in this series is lower than the age of 60 and older mentioned in the literature.

The increase in the frequency of uterine cancers reported in this series, corresponded to 86.8% cases of endometrial endometrioid adenocarcinoma. This variety has been associated with being overweight and/or obese, which was present in 71.4% of the cases studied.

About 63.9% of patients with reproductive tract cancers, who were treated at the Oncology Service of the General Hospital of Mexico "Dr. Eduardo Liceaga," had late-stage cancers.

Conflicts of interest

The authors have no conflicts of interest.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

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