Distribution of Ovarian Tumors in Zonguldak Karaelmas University Hospital. Between 2001 and 2007✍

Figen BARUT[1], Aykut BARUT[2], Gürkan KERTİŞ[1], Sibel BEKTAŞ[1], Banu DOĞAN GÜN[1], Burak BAHADIR[1], Gamze YURDAKAN[1], Şükrü Oğuz ÖZDAMAR[1]

Zonguldak, Turkey

OBJECTIVE: There are numerous types of ovarian tumors, both benign and malignant. The aim of this study was to evaluate the epidemiology of ovarian tumors in Zonguldak and surrounding cities, retrospectively.

STUDY DESIGN: Between May 2001 and March 2007, 769 oophorectomy materials from 494 cases which undergo operation for variable cause were reviewed in Department of Pathology. Tumors were classified.

RESULTS: Ovarian tumor's ratio was (n: 123) 16.0% in all cases. Distribution of 123 ovarian tumors: 73.2% (90) were benign, 7.3% (9) were borderline tumors and 19.5% (24) were malignant. 68 of the cases (55.3%) were surface epithelial-stromal tumor; 34 of the cases (27.7%) were germ cell tumors; 10 of the cases (8.1%) were sex cord-stromal tumors; one of the cases (0.8%) was vascular tumor and 10 of the cases (8.1%) were metastatic tumors.

CONCLUSION: In our study cystadenoma and cystadenocarcinoma were the most frequent benign and malignant tumors respectively and most of them were serous. When compared with the literature, surface epithelial-stromal tumor of the ovary were less frequent, but metastatic tumors to ovary were more frequent in both whole and malignant groups.

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Key Words: Ovarian tumors, Epidemiology, Prevalence

Introduction

Worldwide, ovarian cancer is the sixth most common cancer in women.[1] In most Western countries, ovarian carcinoma is the most common malignancy and ranks fifth in cancer mortality.[1-3] The incidence remains constant.[3] It is predominantly a disease of older white women of Northern European extraction, but it is seen in all ages and all ethnic groups.[4-7] Usually the post-menopausal women are affected.[8] This high mortality is attributed to the lack of symptoms in most patients with early stages of disease. The tumor has spread outside of the pelvis at the time of diagnosis in approximately 70-75% of the patients.[8, 9]

Tumors of the ovary represent about 30% of all cancers of the female genital system. Age-adjusted incidence rates are highest in the economically advanced countries where they are almost as common as cancers of the corpus uteri and invasive cancer of the cervix.[9] There are numerous types of ovarian tumors, both benign and malignant. Majority are benign.[1-3, 8, 9] The aim of this study was to evaluate the epidemiology of ovarian tumor in Zonguldak and surrounding cities, retrospectively.

Material and Methods

Between May 2001 and March 2007, 769 oophorectomy materials from 494 cases which undergone operation for variable causes were reviewed in Karaelmas University Faculty of Medicine, Department of Pathology. All histologic sections were fixed in formalin, embedded in paraffin, cut into 5 µm sections, and stained with hematoxylin and eosin (H&E). When non tumoral changes were excluded from the study, 123 ovarian tumors left for evaluation out of 769. These 123 ovarian tumors were classified according to the World Health Organization (WHO) criteria[1,2,9] as surface epithelial-stromal tumors, germ cell tumors, sex cord-stromal tumors, metastatic tumors and others.

Results

In the seven years period, total number of the oophorectomy material was 769 and ovarian tumor's ratio was 16.0% (n:123). Annual ovarian tumor prevalence was lower in 2001 (4.1%) and higher in 2006 (33.3%) than other years (Graphic 1).

[1]Department of Pathology, [2]Department of Obstetric & Gynecology Zonguldak Karaelmas University Faculty of Medicine Zonguldak, Turkey

Address of Correspondence: *Figen Barut*
Department of Pathology Zonguldak Karaelmas University Faculty of Medicine. Kozlu/Zonguldak,Turkey
figenbarut@yahoo.com

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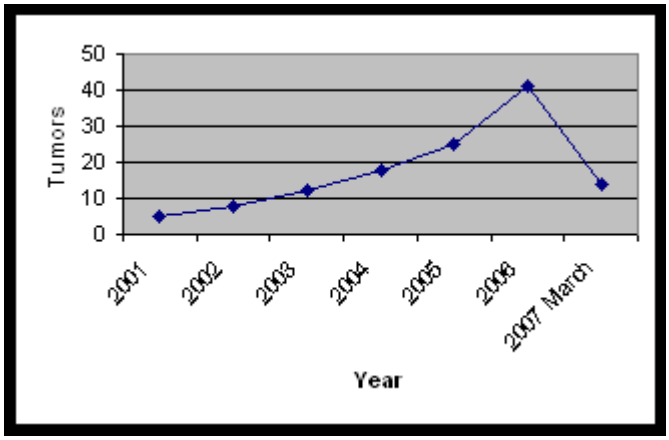
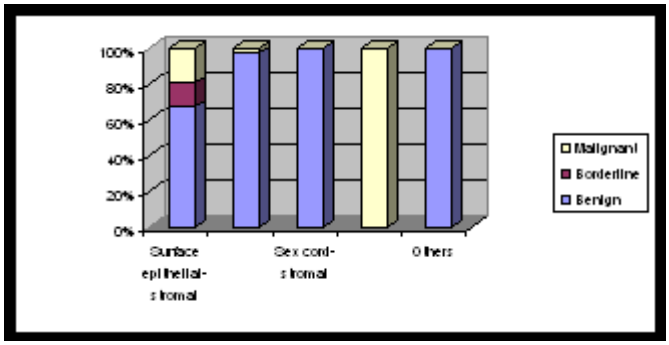


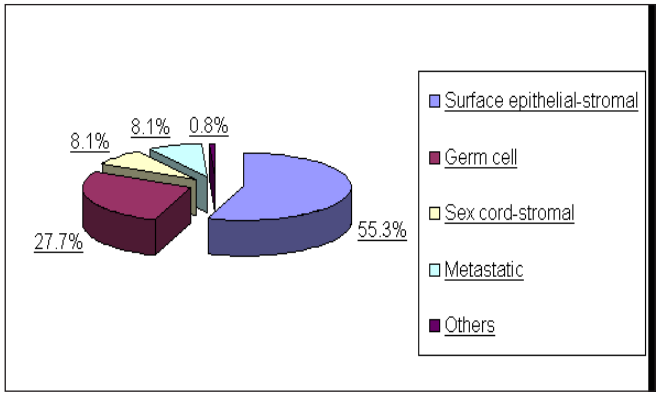
Graphic 1: Ovarian tumor distribution according to years

Age range was between 10 days to 85 years and average age was 45.46 (SD±13, 45) years. In our study, the distribution of ovarian tumors according to tumor behavior was calculated as following: 73.2% (90) benign, 7.3% (9) borderline and 19.5% (24) malignant (Graphic 2).



Graphic 2: Ovarian tumors distribution according to origin and behavior

Distribution of 123 ovarian tumors according to histological types was designated as following (Graphic 3).



Graphic 3: Ovarian tumors distribution according to the origin

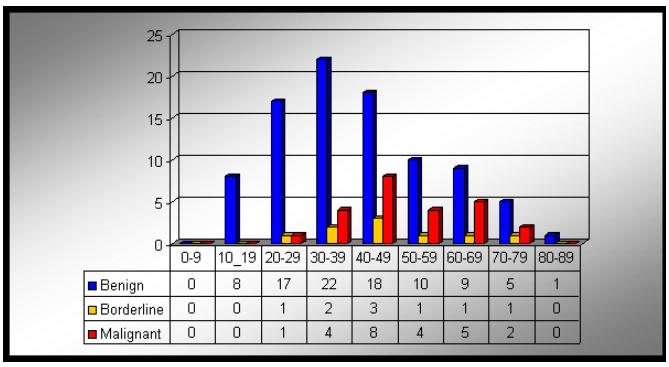
68 of the cases (55.3%) were surface epithelial-stromal tumor of the ovary {38.2% (26) benign serous, 26.5% (18) benign mucinous, 2.9% (2) benign Brenner, 10.3% (7) borderline serous, 2.9% (2) borderline mucinous, 13.2% (9) malignant serous, 1.5% (1) transitional cell carcinoma, 1.5% (1) endometrioid carcinoma, 1.5% (1) clear cell carcinoma, 1.5% (1) undifferantiated carcinoma}; 34 of the cases (27.7%) were germ cell tumors {97.1% (33) mature cystic teratoma, 2.9% (1) teratoma with malignant transformation}; 10 of the cases (8.1%) were sex cord-stromal tumors {10% (1) adult granulosa cell tumor, 10% (1) juvenil granulosa cell tumor, 40% (4) fibroma, 20% (2) fibrothecoma, 10% (1) sclerosing stromal tumor, 10% (1) sex cord-stromal tumor of unclassified}; one of the cases (0.8%) was vascular tumor (cavernous hemangioma) and 10 of the cases were (8.1%) metastatic tumors (Table 1).

Table 1: Distribution of ovarian tumors according to the histological types

Behavior	Histologic Type	Cases		Unilateral		Bilateral	
		%	n	%	n	%	n
	Surface Epithelial-Stromal Tumors	**55.3**	**68**	**45.5**	**56**	**9.7**	**12**
Benign	Serous	38.2	26	42.9	24	16.7	2
	Mucinous	26.5	18	32.1	18	-	-
	Brenner	2.9	2	3.6	2	-	-
Borderline	Serous	10.3	7	8.9	5	16.7	2
	Mucinous	2.9	2	3.5	2	-	-
Malign	Serous carcinoma	13.2	9	1.8	1	66.6	8
	Transitional cell carcinoma	1.5	1	1.8	1	-	-
	Endometrioid carcinoma	1.5	1	1.8	1	-	-
	Clear cell carcinoma	1.5	1	1.8	1	-	-
	Undifferantiated carcinoma	1.5	1	1.8	1	-	-
	Germ Cell Tumors	**27.7**	**34**	**22.8**	**28**	**4.9**	**6**
Benign	Mature cystic teratoma	97.1	33	96.4	27	100	6
Malign	Teratoma with malign transformation	2.9	1	3.6	1	-	-
	Sex Cord-Stromal Tumors	**8.1**	**10**	**6.5**	**8**	**1.6**	**2**
Benign	Adult granulosa cell tumor	10	1	12.5	1		-
	Juvenil granulosa cell tumor	10	1	12.5	1		-
	Fibroma	40	4	25.0	2	100	2
	Fibrothecoma	20	2	25.0	2		-

	Sclerosing stromal tumor	10	1	12.5	1		-
	Sex-cord stromal (unclassified)	10	1	12.5	1		-
Malign	**Metastatic Tumors**	**8.1**	**10**	**3.3**	**4**	**4.9**	**6**
	Others	**0.8**	**1**	0.8	1	-	-
Benign	Cavernous hemangioma	0.8	1	100	1	-	-
Total		100	123	78.9	97	21.1	26

Benign tumors were seen more common in all age groups, on the other hand the peak prevalence of borderline and malignant tumors was encountered between ages 40-49 (Graphic 4) in our study. 97.1% of germ cell tumors were teratoma (one had malignant transformation) and average age of patients were 34.5. Mature cystic teratoma constituted 26.8% of all ovarian tumors, and 96.4% of the teratomas were unilateral.



Graphic 4: Ovarian tumors distribution according to age and behavior

Discussion

Ovarian tumors are one of the common forms of neoplasia in women.[1-3] Cancer of the ovary represents about 30% of the female genital tract.[9,10] Among cancers of the female genital tract, the incidence of ovarian cancer ranks below only carcinoma of the cervix and the endometrium.[2] Pregnancy (especially if before age 25 years) and use of oral contraceptives are associated with a diminished risk.[1-3,8,9,11-14] High parity and the use of oral contraceptives are consistently associated with a reduced risk of developing surface epithelial-stromal tumors while long-term estrogen replacement therapy appears to increase the risk in postmenopausal women.[9] Familial predisposition has been noted in approximately 5% to 10% of cases.[1-3,8,9,15-17]

Certain clinical or gross features may provide important diagnostic clues for management. One of the most important clinical features is the age of the patient. For example, within the surface epithelial category, borderline tumors are often seen in women ages between 30-40 and less frequent in younger women, whereas invasive tumors in this category are rare in women less than 40 years of age. On the other hand, germ cell tumors are almost never found in women over 50 years of age.[8] In our study, benign and borderline tumors were seen in ages 30-50 between, whereas malign tumors were encountered in women over 40 years of age as concordant in the literature. In addition, germ cell tumors were found less than 40 years of age.

The stage and laterality of ovarian tumors also indicate their nature. For example, the sex cord-stromal tumors are almost always confined to single ovary. On the other hand, approximately 65% of the metastatic tumors are bilateral.[8] Laterality of ovarian tumors in our study supports the literature whereas the sex cord-stromal tumors were unilateral and the metastatic tumors were bilateral.

Tumors of the surface epithelium are the most common (65-70%) tumors of the ovary.[1-3, 8,9] Germ cell tumors constitute approximately 20% of all ovarian neoplasms[3]. Sex cord-stromal (5-10%) and metastatic tumors (5%) are less common. When compared with the literature our study designated a lesser rate of surface epithelial-stromal tumors of ovary, but metastatic tumors of ovary are more frequent in both whole and malignant groups. Germ cell tumor's ratio was higher when compared with the literature.

Serous tumors consist of approximately one fourth of all ovarian tumors. Most of the cases are diagnosed in adults. Approximately 30% to 50% are bilateral[3,8,9]. Benign, borderline and malignant tumors are comprise 60%, 15%, and 25% of all serous tumors, respectively.[18,19] In this study, we found that serous tumors rate was relatively high (34.1% of all tumors) when compared with the literature. Most of patients were adult, but bilaterality ratio was (9.7%) lower than the previous studies.

Mucinous neoplasms are less common than serous neoplasms and are bilateral in only 10% to 20% of cases. In this study, mucinous tumors ratio was 16.3 % among all ovarian tumors, and none were bilateral. Furthermore benign and borderline mucinous tumors comprise 90% and 10% of mucinous tumors, respectively. We had no malignant mucinous tumor.

Brenner tumors constitute between 1-2% of all ovarian neoplasms.[20] The average age at presentation is approximately 50 years, 71% of the patients are older than 40 years of age. In this study, like in the literature, Brenner tumors constituted 2.4% of all ovarian tumors, and average age was 61 years.

Most of germ cell tumors are seen in children and young

adults. Approximately 95% of these tumors are mature cystic teratomas. Moreover mature cystic teratomas consist almost 20% of all ovarian neoplasms. They constitute the most common ovarian tumor in chidhood.[21] The 88% of cases are unilateral; we found the almost same rate in our study. Germ cells tumor and mature cystic teratoma's ratio in this study were a little higher than the literature, and the ratios were 27.7% and 26.8% respectively.

Sex cord-stromal tumors, which comprise approximately 5% of all ovarian neoplasms, are tumors that differentiate in the direction of sex cords and/or the specialized ovarian stroma.[22] Thecoma and fibroma are usually unilateral. Thecoma are diagnosed after menopause in 65% of patients but fibromas are invariably encountered almost after puberty.[23] Sclerosing stromal tumor, which is a sex cord-stromal tumor, is a benign ovarian neoplasm that shares many common features with fibroma and thecoma. However, it is encountered in a younger age group.[22,23] We had 6 fibroma and thecoma cases, contrary to the literature all of these tumors were encountered in old patients.

Hemangiomas of the ovary are usually small, found incidentally, unilateral, and cavernous in type. Rarely, they are bilateral and/or associated with hemangiomas elsewhere in the body.[24] We had only one hemangioma and that was cavernous type.

The ovary is a common site of involvement for metastases. Approximately 7% of lesions presenting clinically as primary ovarian tumors are of metastatic origin. Over half are bilateral. The most common sources are the stomach, large bowel, appendix, breast, uterus (corpus and cervix), lung, and skin (melanoma).[25] Our metastatic tumor ratio was 8.1% in all ovarian tumors and this ratio was 41.6% in malignant group. The metastatic tumors were from stomach, endometrium, breast, and lymph node.

In conclusion, the retrospective data obtained from this study may contribute to other investigations to evaluate the epidemiology of ovarian cancer.

2001 ve 2007 Arası Zonguldak Karaelmas Üniversitesi Hastanesi Ovaryan Tümör Dağılımı

Figen BARUT, Aykut BARUT, Gürkan KERTİŞ
Sibel BEKTAŞ, Banu DOĞAN GÜN, Burak BAHADIR
Gamze YURDAKAN, Şükrü Oğuz ÖZDAMAR

Zonguldak, Türkiye

Hem benign hem de malign olmak üzere çok sayıda ovaryan tümör tipleri mevcuttur. Çalışmanın amacı, Zonguldak ve çevre şehirlerdeki ovaryan tümörlerin epidemiyolojisini retrospektif olarak değerlendirmektir. Patoloji bölümünde Mayıs 2001 ve Mart 2007 arası, değişik sebeplerden operasyona gitmiş 494 olgudan elde edilen 769 ooferektomi materyali gözden geçirilmiştir. Tümörler sınıflandırılmıştır. Ovaryan tümörlerin oranı tüm olgularda %16.0' (n:123) dır. 123 ovaryan tümörün dağılımı: %73,2'si (90) benign, %7,3'ü (9) borderline ve %19,5'i (24) ise malign tümörlerdir. Olguların 68'si (%55,3) yüzey epitelyal-stromal tümörler; 34'ü (%27,7) germ hücreli tümörler; 10'u (%8,1) seks kord-stromal tümörler; biri (%0,8) vasküler tümör ve 10'u (%8,1) metastatik tümörlerdir.
Bizim çalışmamızda retrospektif olarak, kistadenom ve kistadenokarsinom, en sık görülen benign ve malign tümörler olup, bunların çoğunluğuda serözdür. Literatürlerle kıyaslandığında, overin yüzey epitelyal-stromal tümörleri daha az sıklıkla, fakat metastatik tümörleri hem over tümörleri içerisinde hem de malign grupta daha sık izlenmiştir.

Anahtar Kelimeler: Ovaryan tümörler, Epidemiyoloji, Prevalans

References

1. Seidman JD, Russell P, Kurman RJ. Surface Epithelial Tumors of the Ovary; In: Kurman RJ, ed. Blaustein's Pathology of the Female Genital Tract. 5th ed. Springer: Verlag, 2001: p: 791-904.
2. Crum CP. The female genital tract. In: Kumar V, Abbas AK, Fausto N, eds. Robins and Cotran Pathologic basis of disease, 7th ed. Philadelphia: Elsevier Saunders, 2005: p:1059-117.
3. Rosai J. Female reproductive system-Ovary. In: Rosai J ed. Rosai and Ackerman's surgical pathology. 9th ed. Philadelphia: Mosby, 2004: p: 1649-1736.
4. Cannistra SA. Cancer of the ovary. N Engl J Med 1993; 329:1550-9.
5. Markman M, Lewis JL Jr, Saigo P, Hakes T, Jones W, Rubin S, Reichman B et al. Epithelial ovarian cancer in the elderly. The Memorial Sloan-Kettering Cancer Center experience, Cancer 1993; 71:634-7.
6. Rodriguez M, Nguyen HN, Averette HE, Steren AJ, Penalver MA, Harrison T, Sevin BU. National survey of ovarian carcinoma. XII. Epithelial ovarian malignancies in women less than or equal to 25 years of age, Cancer 1994; 73:1245-50.
7. Yancik R. Ovarian cancer. Age contrasts in incidence, histology, disease stage at diagnosis, and mortality, Cancer 1993; 71:517-23.
8. Prat J. Female Reproductive System. In: Damjanov I, Linder J eds. Anderson's Pathology. 10th ed. Mosby: St. Louis, 1996: p: 2231-309.
9. Lee KR, Tavassoli FA, Prat J, Dietel M, Gersell DJ, Karseladze AI et al. Tumours of the ovary and peritoneum. In: Tavassoli FA, Devilee P eds. World Health Organization Classification of Tumours, Pathology and Genetics, Tumours of the Breast and Female Genital

Organs. Lyon: IARC Press, 2003: p: 113-202.

10. Piver MS, Baker TR, Piedmonte M, Sandecki AM. Epidemiology and etiology of ovarian cancer. Semin Oncol 1991; 18:177-85.
11. Greene MH, Clark JW, Blayney DW. The epidemiology of ovarian cancer. Semin Oncol 1984; 11:209-26.
12. Harlow BL, Weiss NS, Roth GJ, Chu J, Daling JR. Case-control study of borderline ovarian tumors, Reproductive history and exposure to exogenous female hormones. Cancer Res 1988; 48:5849-52.
13. Richardson GS, Scully RE, Nikrui N, Nelson JH. Common epithelial cancer of the ovary. N Engl J Med 1985; 312:415-24.
14. Weiss NS. Measuring the separate effects of low parity and its antecedents on the incidence of ovarian cancer. Am J Epidemiol 1988; 128:451-5.
15. Greggi S, Genuardi M, Benedetti-Panici P, Cento R, Scambia G, Neri G, Mancuso S. Analysis of 138 consecutive ovarian cancer patients. Incidence and characteristics of familial cases. Gynecol Oncol 1990; 39:300-4.
16. Lynch HT, Watson P, Bewtra C, Conway TA, Hippee CR, Kaur P, Lynch JF et al. Hereditary ovarian cancer. Heterogeneity in age at diagnosis. Cancer 1991; 67:1460-6.
17. Piver MS, Baker TR, Jishi MF, Sandecki AM, Tsukada Y, Natarajan N, Mettlin CJ et al. Familial ovarian cancer: A report of 658 families from the Gilda Radner Familial Ovarian Cancer Registry 1981-1991. Cancer 1993;71: 582-8.
18. Dietel M, Hauptmann S. Serous tumors of low malignant potential of the ovary. Diagnostic pathology. Virchows Arch 2000; 436:403-12.
19. Silva EG, Kurman RJ, Russell P, Scully RE. Symposium: ovarian tumors of the borderline malignancy. Int J Gynecol Pathol 1996; 15:281-307.
20. Silverberg SG. Brenner tumor of the ovary. A clinicopathologic study of 60 tumors in 54 women. Cancer 1971; 28:588-96.
21. Ein SH, Darte JMM, Stephens CA. Cystic and solid ovarian tumors in children. A 44-year review. J Pediatr Surg 1970; 5:148-56.
22. Young RH, Scully RE. Ovarian sex cord-stromal tumors. Problems in differential diagnosis. Pathol Annu 1988; 23:273-96.
23. Fox H. Sex cord-stromal tumours of the ovary. J Pathol 1985; 145:127-48.
24. Alvarez M, Cerezo L. Ovarian cavernous hemangioma. Arch Pathol Lab Med 1986; 110:77-8.
25. Demopoulos RI, Touger L, Dubin N. Secondary ovarian carcinoma. A clinical and pathological evaluation. Int J Gynecol Pathol 1987; 6:166-75.