Development of secondary ovarian lesions after hysterectomy without oophorectomy versus unilateral oophorectomy for benign conditions: A retrospective analysis of patients during a nine-year period of observation

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Summary

Purpose: The effect of retained one or both ovaries on the de novo ovarian pathologies required re-operation after hysterectomy due to benign gynecologic conditions were investigated retrospectively. This study was done to determine the occurrence of disease in retained ovaries after hysterectomy. *Methods:* A retrospective analysis of patient charts was performed, comparing the patient reports of women who had secondary ovarian lesions those whose previously undergone total abdominal hysterectomy with unilateral oophorectomy or without oophorectomy in our Department during the nine year period of observation (2000-2009). The study included 1242 women with at least one ovary saved after hysterectomy for benign indications. *Results:* De novo ovarian disease was established in 5.1% of patients of hysterectomy without oophorectomy and in 17.6% of patients of at least one ovary saved after hysterectomy for benign indications ($p = 0.005$). Ovarian pathology requiring re-operation developed in 3.8% of patients who underwent hysterectomy without oophorectomy and in 5.9% of patients who underwent hysterectomy with unilateral oophorectomy ($p = 0.536$). *Conclusion:* Women with unilateral oophorectomy at the time of hysterectomy had more than twice the risk of secondary ovarian lesions, compared with those without oophorectomy at hysterectomy. Determinants, such as age, parity and gravidity must be considered when deciding whether or not to perform oophorectomy at hysterectomy.

Key words: Hysterectomy with unilateral oophorectomy; Hysterectomy without oophorectomy; Secondary ovarian lesions.

Introduction

It is controversial to preserve normal appearing ovaries during gynecological surgery for benign disease in premenopausal women. The incidence of re-operation for de novo developed ovarian pathologies after hysterectomy is suggested to be 3.95%. This risk of re-operation is higher during the first three years. The risk of ovarian pathology is significantly higher among patients in whom only one ovary is saved after hysterectomy [1].

Age, primary histological findings, and degree of peritoneal trauma are the most important factors affecting development of ovarian pathologies after performing vaginal, laparoscopic, and abdominal hysterectomy [2].

In this study, the incidence of developed pathologies required relaparotomy after hysterectomy due to benign gynecologic disease and the consequences of saving one or both ovaries on the de novo developed pathologies were investigated. As a conclusion of our survey, the risk of pathological outcome of retained ovaries is discussed because of benign gynecological disease after hysterectomy.

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Materials and Methods

In this retrospective analysis, data obtained from patients who had undergone total abdominal hysterectomy with unilateral oophorectomy or without oophorectomy in the Obstetrics and Gynecology Department of Izmir Ataturk Training and Research Hospital between 01/06/2000 and 01/06/2009 were evaluated. Selection criteria for this study included women who had undergone hysterectomy for benign conditions where at least one ovary was saved. The patients could be contacted by enrolled address and telephone numbers, and were invited to regular examinations annually in the outpatient clinic. The patients who responded to our invitation for evaluation were asked whether or not they had developed any adnexal/ovarian pathological findings and required further gynecologic examination. Ovaries and salpinges were evaluated transvaginally by ultrasound. The patients presenting ovarian pathology were treated by a medical or surgical approach after hysterectomy was registered. The time interval and histopathologic results of developed de novo ovarian pathological lesions after hysterectomy were recorded.

SPSS 15.0 software was used for statistical analysis. Parametric data were tested for their normal distribution and results are presented by using figures with the percentages. Continued variables of the groups of total abdominal hysterectomy without oophorectomy and with unilateral oophorectomy were tested using Mann-Whitney U-tests. Categorical variables of the groups with total abdominal hysterectomy without oophorectomy and with unilateral oophorectomy were tested using Pearson's and Fisher's exact tests. Spearman's correlation and logistic regression analysis were performed. A value of $p < 0.005$ was considered as significant.

Results

Total abdominal hysterectomy without oophorectomy and with unilateral enrolled oophorectomy was performed on 1,531 patients between 01/06/2000 and 01/06/2009. We reached 12,871 of them by post and telephone calls and 1,242 patients responded to our invitation. There was no presenting pathological finding at the last gynecological and transvaginal ultrasound examinations. After the patients had undergone hysterectomy, an adnexal mass developed in 102 patients, and re-operation was performed on 54 of them. There were no differences between the groups of hysterectomy without oophorectomy and with unilateral oophorectomy in terms of age, menarche age, gestation, and parity (Table 1).

Table 1. — *Continued variables of the group that underwent total abdominal hysterectomy without oophorectomy and the group with unilateral oophorectomy. Mann-Whitney U tests were performed.*

	TAH		TAH+USO		*p* value
	mean ± SD	range	mean ± SD	range	
Age	39.72 ± 4.94	20-47	41.25 ± 5.69	28-54	0.080
Menarche	13.15 ± 1.34	9-16	13.41 ± 1.52	11-17	0.868
Gestation	2.94 ± 1.86	0-9	3.37 ± 1.72	1-7	0.171
Parity	2.32 ± 1.45	0-6	2.39 ± 1.20	1-6	0.836
Follow-up time (month)	38.51 ± 31.25	1-112	52.57 ± 31,37	1-111	0.005
Reop. interval (months)	25.50 ± 13.17	11-49	28.00 ± 7.81	19-33	0.517

There were also no differences between the groups in terms of infertility, systemic disease, genital disease, breast disease and any familial cancer. Preoperative ovarian diseases were encountered more in the group of hysterectomy with unilateral oophorectomy (Table 2).

Indications and histopathological results of the hysterectomies are summarized in Table 3. Mostly the former indication of the operation was leiomyoma in the group of patients who underwent hysterectomy without oophorectomy, while endometrial hyperplasia, endometriosis, and an adnexal mass were significantly more frequent in the group of patients who underwent hysterectomy with unilateral oophorectomy.

Mean follow-up time was 38.51 months in the group of patients without oophorectomy and 52.57 months in the group of patients with unilateral oophorectomy. During this period, ovarian disease was established in 48 (5.1%) patients of the group with hysterectomy without oophorectomy, and re-operation was performed in 36 (3.8%) of them. Ovarian diseases developed in 54 (17.6%) patients in the group with hysterectomy and unilateral oophorectomy, and 18 (5.9%) were re-operated. The frequency of ovarian pathologies requiring re-operation after hysterectomy was 3.8% in patients with both ovaries preserved, 5.9% in patients with only one ovary preserved, and 4.3% in all patients. There were no significant differences between the groups with or without re-operation according to age, menarche, gestation, parity, and follow-up time (Table 4).

Histopathologic results of the surgical specimens: functional ovarian cysts in six patients and benign tumors in the other 48 patients. Mean time-interval after hysterectomy and re-operation was 26.33 months for all patients. The mean-time intervals were 25.50 months in only hysterectomy patients, and 28.00 months in hysterectomy with unilateral oophorectomy patients.

There were weak correlations between development of ovarian pathologies after hysterectomies done for indica-

Table 2. — *Categorical variables of the group that underwent total abdominal hysterectomy without oophorectomy and the group with unilateral oophorectomy.*

	TAH		TAH+USO		*p* value
	number	percent	number	percent	
Infertility	84	9.0	0	0	0.024#
Systemic disease	420	44.9	108	35.3	0.230*
Genital disease	48	5.1	36	11.8	0.101*
Breast disease	24	2.6	0	0	0.574#
Familial cancer history	48	5.1	0	0	0.204#
Postoperative ovarian disease	48	5.1	54	17.6	0.005*
Re-operation required (ovarian disease)	36	3.8	18	5.9	0.536*

*Pearson's and #Fisher's exact tests were performed.

Table 3. — *Indications and histopathology of the hysterectomies were compared with *Pearson's and #Fisher's exact tests.*

	TAH		TAH+USO		*p* value
	number	percent	number	percent	
Indications					
Uterine myoma	726	77.6	138	45.1	0.000*
Dysfunctional uterine bleeding	72	7.7	24	7.8	0,972*
CIN	36	3.8	24	7.8	0.248*
Uterine atonia	48	5.1	0	0	0.204#
Hydatiform mole	12	1.3	0	0	1.000#
Endometrial hyperplasia	42	4.5	24	7.8	0,003#
Pelvic inflammatory disease	0	0	24	7.8	0.354*
Endometriosis	0	0	12	3.9	0.060#
Adnexal mass	0	0	60	19.9	0.000*
Pathology					
Leiomyoma	630	67.3	162	52.9	0.064*
Adenomyosis	108	11.5	48	15.7	0.437*
Infection-dependent variables	12	1.3	12	3.9	0,255#
Pregnancy-dependent variables	36	3,8	0	0	0,340#
CIN	36	3.8	12	3.9	1.000#
Endometrial hyperplasia	42	4.5	24	7.8	0.354*
Others	72	7.7	48	15.7	0.093*

Table 4. — *Groups with or without re-operation were compared with Mann-Whitney U tests.*

	The group with re-operation (n: 9)		The group without re-operation (n: 198)		*p* value
	mean ± SD	range	mean ± SD	range	
Age	41.11 ± 6.17	33-49	40.06 ± 5.12	20-54	0.833
Menarche	13.11 ± 1.05	12-15	13.22 ± 1.40	9-17	0.764
Gestation	3.44 ± 1.23	2-5	3.03 ± 1.85	0-9	0.333
Parity	2.78 ± 1.20	1-4	2.32 ± 1.40	0-6	0.180
Follow-up time (months)	59.56 ± 31.25	28-104	41.18 ± 31.78	1-112	0.064

tions of endometrial hyperplasia (rho: –0.243, $p < 0.001$), adnexal mass (rho: –0.179 *p:* 0.010), and unilateral oophorectomy (rho: –0.196, *p*: 0.005). There was also a weak correlation between pathologies requiring re-operation after hysterectomy and indications of an adnexal mass (rho: 0.173, *p*: 0.013).

Discussion

There is no consensus concerning optimal adnexal surgery during abdominal hysterectomy, when continued hormonal function is desired, associated with reduced sequelae in the future.

Oophorectomy was performed for the purpose of preventing ovarian cancer in 78% of hysterectomies of women between age 45 and 64. However the rate of mortality for ovarian cancer is less than the rate of mortality for cardiovascular disease and hip fracture in these age intervals. Hysterectomy alone has been shown to reduce the risk of developing ovarian cancer by an average of 46% [3]. Prophylactic oophorectomy has been shown to reduce the incidence of ovarian cancer by 8-18% in the literature from developed countries. However, in the countries in which incidence of ovarian cancer is much lower than those in developed countries, prophylactic oophorectomy in women undergoing hysterectomy reduced the ovarian cancer incidence by 0.4-3.2% [4].

Hormonal analysis showed that the functions of the dismissed ovaries were more rapidly lost than the controls of the same age intervals. The results of Chan's study suggested that hysterectomy with ovarian conservation could preserve a woman's normal hormonal milieu. The uterus could have a control mechanism on ovulation, and hysterectomy might stimulate early menopause [5].

The changes in the ovaries were investigated in patients who had undergone abdominal hysterectomy with conservation of the ovaries for benign conditions [6]. It was established that hysterectomy affected ovarian blood supply and function. Women with hysterectomy had significant elevated serum FSH level and lower ovarian stromal blood flow as compared with healthy women. There was good correlation between Doppler and endocrine parameters [7-9]. There was an increase in ovarian vascular resistance following hysterectomy. These changes may be responsible for altered ovarian function hysterectomy.

Bukovsky *et al*. examined ovarian function following abdominal hysterectomy with or without unilateral oophorectomy and they reported that 35% of patients undergoing unilateral oophorectomy demonstrated impaired ovarian function six months after the operation, whereas only one of the patients with both ovaries preserved demonstrated impaired ovarian function. Thus, if the ovaries are to be preserved at hysterectomy, it seems to be more beneficial to preserve both ovaries [9].

In an experimental rat model, histopathologic evaluation of the ovaries after hysterectomy showed that ovaries of the hysterectomized group had significantly fewer primary, preantral, and antral follicles, and significantly more corpora lutea, atretic, and cystic follicles [10].

The results of this experimental rat model suggest that hysterectomy may affect ovarian function. Therefore, when continued ovarian function following abdominal hysterectomy is desired and ovarian cystic pathologies are not encountered, preservation of both ovaries seems to be more beneficial [10].

Holub *et al*. found that the rate of adnexal pathologies requiring re-operation after abdominal hysterectomy was 5.67%. They suggested that the important factors affecting re-operation rate were age, primary histologic findings, and smaller peritoneal trauma [2].

Plöckinger *et al*. published a study which included 1,265 women with at least one ovary saved after hysterectomy for benign indications [1]. They found that development of ovarian pathologies requiring re-operation after hysterectomy was suggested to be 3.95% of patients. Of the patient group with prior hysterectomy, 7.63% had some pathologies in the retained ovary. Among patients with hysterectomy only, 3.47% developed ovarian pathologies requiring re-operation. In our study, 4.3% required re-operation. This ratio was found to be 3.8% for patients with both ovaries saved, while 5.9% for patients with one ovary saved after hysterectomy. This difference was not statistically significant. The re-operated patients in Plöckinger's study had undergone hysterectomy at a younger age, had less parity, and had more nulliparity than the patients who were not re-operated. We did not find any difference in age, parity and gravidity between the patients with and without re-operation. The mean intervals between hysterectomy and re-operation were 29.5 (1-120) months in Plöckinger's study, and 26.3 (11-49) months in our study. Follow-up time of the groups in our study showed re-operation interval was longer, but not statistically significant. Longer follow-up time may lead to more established pathologies.

A decrease in blood flow and endocrine functions were noted in ovaries preserved after hysterectomy in various studies [10]. Ovarian function loss was earlier in cases in whom one ovary was left than cases in whom both ovaries were left. On the other hand, when one ovary was left, the incidence of developing an ovarian pathology which might require re-operation was more frequent. More studies are needed to determine the factors which affect the development of secondary ovarian lesions when single or both ovaries are left. Simply, after the results of these studies the final decision to perform elective oophorectomy at the time of hysterectomy for benign disease could be established on an individual basis.

Conclusion

Women with unilateral oophorectomy at the time of hysterectomy had more risk of secondary ovarian lesions compared with those without oophorectomy at hysterectomy. Determinants such as age, parity and gravidity must be considered when deciding whether or not to perform oophorectomy at hysterectomy.

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