



The Effect of Surgical Menopause on Vasomotor Symptoms and Anxiety in Women: A Prospective Study

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Abstract

Aim: To investigate the effect of adding oophorectomy on patients who underwent abdominal hysterectomy in the perimenopausal period on menopause, sexual function and mental status.

Materials and Methods: The study was designed prospectively. Women who underwent total abdominal hysterectomy and bilateral salpingectomy (TAH+BS) and total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH+BSO) in the perimenopausal period for benign indications were included in the study. Three months after surgery, menopausal symptoms (such as vasomotor symptoms, vaginal dryness and/or dyspareunia, memory and sleep problems) were investigated. Beck Anxiety Inventory (BAI) scores were investigated one day before the operation and three months after the operation.

Results: 51 patients with TAH+BS and 55 patients with TAH+BSO included in study. Vasomotor symptoms and postoperative BAI scores were significantly higher in the oophorectomy group ($p<0.001$ and $p=0.009$, respectively). Vaginal dryness and/or dyspareunia, which adversely affect sexual function, were significantly higher in the oophorectomy group ($p=0.005$). Memory and sleep problems were higher in the oophorectomy group ($p=0.009$ and $p<0.001$, respectively). Postoperative BAI scores were found to be correlated with postmenopausal symptoms (vasomotor symptoms, vaginal dryness and/or dyspareunia, memory problems, sleeping disorders) in the TAH+BSO group.

Conclusion: Vasomotor symptoms, vaginal dryness and/or dyspareunia, memory and sleeping problems, and anxiety levels were significantly higher in patients who underwent bilateral salpingo-oophorectomy with hysterectomy compared to patients who underwent only hysterectomy and bilateral salpingectomy. It seems useful to inform the patients who are planned for the operation regarding these effects before the decision of oophorectomy.

Keywords: Hysterectomy, oophorectomy, menopause, sexual dysfunction

INTRODUCTION

Hysterectomy is performed frequently in women and is the second most common major surgery after cesarean section in women (1). Hysterectomy surgeries are performed to treat benign indications such as abnormal uterine bleeding, uterine fibroids, adenomyosis, as well as gynecological malignancies such as cervical, endometrial, and ovarian cancers (2,3). It can be performed abdominally, laparoscopically, or vaginally, depending on the surgeon's experience and the patient's previous surgical history or the size of the uterus (4). Abdominal hysterectomy is the

excision of the uterus via laparotomy. The surgery can be performed as a total hysterectomy (including the cervix) or a subtotal (supracervical) hysterectomy. The ovaries may or may not be excised during a hysterectomy. A study conducted in 2009 showed that 68% of the patients underwent unilateral or bilateral oophorectomy during abdominal hysterectomy, 60% of patients underwent unilateral or bilateral oophorectomy in laparoscopic hysterectomy, and 26% of patients underwent unilateral or bilateral oophorectomy was performed in during vaginal hysterectomy (5). A 2014 study showed that 44 percent of patients younger than 51 years of age had an

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oophorectomy during a hysterectomy for benign indications (6). The choice of surgical technique and method depends on clinical findings, surgeon's expertise and patient preference. Excision of normal ovaries in premenopausal women during hysterectomy is still controversial. There are no accepted criteria for the preservation or removal of the ovaries or the removal of a single ovary. The main purpose of oophorectomy is to protect against ovarian cancer. However, surgical menopausal side effects limit this view.

Surgical menopause after total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH+BSO) causes a sudden increase in follicle stimulating hormone (FSH) levels, a sudden drop in estrogen and progesterone levels (7). In contrast, the transition to natural menopause is characterized by varying levels of estradiol and FSH levels in conjunction with ovulatory and anovulatory cycles, and the variability in hormone levels can persist for up to 10 years (8). In surgical menopause, sudden hormonal changes are associated with more severe menopausal symptoms. With the transition to menopause, symptoms such as sleep disorders, decreased sexual activity and memory problems can be observed in women. Vasomotor symptoms are the hallmarks of the perimenopausal-menopausal period. These symptoms are observed in approximately 80% of women and seriously affect the patient's quality of life (9,10). Although vasomotor symptoms may be observed more severely in surgical menopause, sexual dysfunction and related depressive symptoms are likely to be observed more frequently (11).

The aim of this study was to investigate the effect of adding oophorectomy on patients who underwent abdominal hysterectomy in the perimenopausal period on menopause, sexual function and mental status.

MATERIAL AND METHOD

Study type

This study was a prospective study conducted between October 1, 2020 and July 1, 2021 at the Department of Obstetrics and Gynecology, University of Health Sciences Tepecik Training and Research Hospital. Power analysis was performed with G-power for the number of samples. Accordingly, a minimum limit of 38 people was found for each group.

Study group

This study included women who underwent total abdominal hysterectomy and bilateral salpingectomy (TAH+BS) and total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH+BSO) in the perimenopausal period for benign indication. In our clinic, oophorectomy option is offered to patients aged 45 and over who are found suitable, and additional consent is obtained from patients who accept before surgery. Patients with previous psychiatric disease, sexual dysfunction, memory or sleep problems, and patients who underwent hysterectomy for malignant indications, and receiving hormonal therapy for menopausal reasons were excluded.

Variables and data collection

Demographic and medical data of the patients such as age, gravida, parity, smoking and body mass index (BMI) were recorded. Three months after surgery, menopausal symptoms (such as vasomotor symptoms, vaginal dryness and/or dyspareunia, memory and sleep problems) were investigated. Beck Anxiety Inventory (BAI) scores of the patients were investigated one day before the operation and three months after the operation. The data were filled in by face-to-face interviews with the women with the help of the forms prepared by the researchers according to the literature and the form consisting of questions questioning the post-operative complaints of the women.

Procedures

Beck et al. developed a Beck Anxiety Inventory (BAI) and used it to assess the patient's mental changes (12). It was validated in Turkey by Hisli (13). The scale consists of 21 questions. In this test, patients answer the questions by selecting one of four options: "none, mild, moderate, severe". None is 0 points, mild is 1 point, moderate is 2 points, and severe is 3 points. Points are calculated at the end of the test. Total score; A score of 8-15 is categorized as mild anxiety symptoms, a score of 16-25 as moderate anxiety symptoms, and a score of 26-63 as severe anxiety symptoms.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Figure 1. Beck Anxiety Inventory (BAI) (12)

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) v26.0 program was used for data analysis. The Kolmogorov-Smirnov test was used to determine the distributions of normality. Independent T test was applied in the analysis of normally distributed variables and data were given as mean±SD. The Mann Whitney U test was applied in the analysis of non-normally distributed variables and the data were given as median (min-max). Categorical variables were estimated with the Chi-square test. Spearman's correlation test was applied to evaluate the correlation between groups. p<0.05 assumed to be significant.

Ethics

Before the study was started, written permissions were obtained from the patients. This study was approved by the University of Health Sciences Tepecik Training and Research Hospital Ethics Committee (approval number: 2021/10-20).

RESULTS

A total of 106 patients who met the criteria were included in the study. TAH+BS was applied to 51 of the women participating in our study, and TAH+BSO was applied to 55 of them. All patients did not have any previous psychiatric disease, sexual dysfunction, memory or sleep problems.

The average age of the patients in the TAH+BS group was 43±5 years, and the average age of the patients in the TAH+BSO group was 50±7 years, and the difference between them was significant ($p<0.001$). The gravidity of the TAH+BS group was 3 (0-11), and the TAH+BSO group was 4 (1-14), and the difference between them was not significant. While there was no nulliparous patient in the TAH+BSO group, there were 4 nulliparous patients in the TAH+BS group. While all of the TAH+BSO group consisted of multiparous patients, 92.2% of the TAH+BS group consisted of multiparous patients, and there was a significant difference between the parity of the groups ($p=0.034$). The mean BMI was 26±3.7 in the TAH+BS group, 26.5±3.1 in the TAH+BSO group, and there was no significant difference. While 23.5% of the TAH+BS group smokers, 25.5% of the TAH+BSO group smokers, and the difference was not significant (Table 1).

Table 1. Demographic and medical characteristics of TAH+BSO and TAH+BS groups

	TAH+BSO (n=55)	TAH+BS (n=51)	p value
Age (mean±SD)	50±7	43±5	<0.001
Gravidity median (min-max)	4 (1-14)	3 (0-11)	0.081
Parity (n,%)			0.034
Nulliparous	0	4 (7.8%)	
Multiparous	55 (100%)	47 (92.2%)	
BMI (kg/m ²) (mean±SD)	26.5±3.1	26±3.7	0.790
Smoking (n,%)	14 (25.5%)	12 (23.5%)	0.818

Abbreviations: BMI: body mass index

Vasomotor symptoms were questioned. These symptoms were observed in 11.8% (6 patients) of the TAH+BS group and 70.9% (39 patients) of the TAH+BSO group, and were significantly higher in the TAH+BSO group ($p<0.001$). Vaginal dryness and/or dyspareunia were present in 21.6% (11 patients) of the TAH+BS group and 47.3% (26 patients) of the TAH+BSO group, and the symptoms were higher in the TAH+BSO group ($p=0.005$). Memory problems such as attention disorder and forgetfulness were questioned and it was determined that 7.8% of the

TAH+BS group (4 patients), and 34.5% (19 patients) of the TAH+BSO group had significant differences between them ($p=0.009$). Sleeping disorders such as insomnia, fatigue, and sleepiness were questioned. It was detected in 7.8% (4 patients) of the TAH+BS group and 34.5% (19 patients) of the TAH+BSO group ($p<0.001$). While the mean of preoperative BAI was 5±3 in the TAH+BS group, it was 4±3 in the TAH+BSO group, and the mean postoperative BAI was 8±6 in the TAH+BS group and 10±6 in the TAH+BSO group; the mean postoperative BAI was higher in the TAH+BSO group than the TAH+BS group ($p=0.009$) (Table 2).

Table 2. Menopausal symptoms and BAI scores of TAH+BSO and TAH+BS groups

	TAH+BSO (n=55)	TAH+BS (n=51)	p value
Vasomotor symptoms ^a (n,%)	39 (70.9%)	6 (11.8%)	<0.001
Vaginal dryness and/or dyspareunia (n,%)	26 (47.3%)	11 (21.6%)	0.005
Memory problem ^b (n,%)	15 (27.3%)	4 (7.8%)	0.009
Sleeping disorder ^c (n,%)	19 (34.5%)	4 (7.8%)	<0.001
Preop BAI (mean±SD)	4±3	5±3	0.117
Postop BAI (mean±SD)	10±6	8±6	0.009

Abbreviations: BAI: Beck Anxiety Inventory
^aInclude hot flashes and night sweats
^bInclude attention disorder and forgetfulness
^cInclude insomnia, daytime fatigue and sleepiness

Postoperative BAI scores were found to be correlated with postmenopausal symptoms (vasomotor symptoms, vaginal dryness and/or dyspareunia, memory problems, sleeping disorders) in the TAH+BSO group (Table 3).

Table 3. Correlation of postoperative TAH+BSO group BAI score with menopausal symptoms

	r value	p value
Vasomotor symptoms ^a (n,%)	0.486	<0.01
Vaginal dryness and/or dyspareunia (n,%)	0.644	<0.01
Memory problem ^b (n,%)	0.555	<0.01
Sleeping disorder ^c (n,%)	0.474	<0.01

^aInclude hot flashes and night sweats
^bInclude attention disorder and forgetfulness
^cInclude insomnia, daytime fatigue and sleepiness

DISCUSSION

Bilateral salpingo-oophorectomy, which is electively added to hysterectomies for benign diseases, can often be performed to reduce the risk of malignancy or other adnexal pathologies. In a study conducted in the USA, it was shown that oophorectomy is added to operations for these reasons in approximately half of hysterectomies (14,15). In North America, 250.000 women enter surgical menopause each year due to bilateral oophorectomy (16). The rationale for this approach was that ovariectomy significantly reduces the risk of ovarian cancer and the

requirement for future ovarian surgery and that ovarian preservation offers little benefit as patients in this age group are near or past menopause (17,18). However, the menopausal side effects of this approach have led to discussion of this issue, and contrary to these findings, some studies suggest that prophylactic oophorectomy is an unnecessary practice that deprives women of the benefits of ovarian function (19,20).

Bachmann, showed that vasomotor symptoms in surgically menopausal women are more severe and persist for longer than in physiologically menopausal women (21). Marra et al. in their study that all women (100%) with surgical menopause experience a wide variety of vasomotor symptoms (22). According to their studies, 90% of women experience more severe hot flashes than those who are going through natural menopause. In our study, proportion of patients with vasomotor symptoms was significantly higher in the TAH+BSO group than in the TAH+BS group, showing that we obtained results consistent with the literature. It is thought that the rapid hormonal change that occurs in surgical menopause causes this condition (7,8).

Compared to natural menopause, which is a slow process, the withdrawal of estrogen, progesterone and androgens is abrupt in surgical menopause. Studies have shown that TAH+BSO operation performed in the premenopausal period has negative effects on psychosexual health (23,24). In the study by Lonnee-Hoffmann et al., it was shown that after oophorectomy performed in the perimenopausal period, more dyspareunia, more sexual reluctance, vaginal dryness and less sexual satisfaction were observed (25). Similarly, in our study, a relationship was found between vaginal dryness and/or dyspareunia and surgical menopause, and sexual comfort was negatively affected in patients who underwent oophorectomy.

In our study, memory problems (attention disorder and forgetfulness) were significantly higher in the TAH+BSO group. Similar to our study, some studies have shown that surgical menopause may be associated with memory problems (9,26). In their meta-analysis of 18.867 samples, Georgakis et al. showed that surgical menopause with bilateral oophorectomy at the age of ≤ 45 years was associated with an increased risk of dementia and cognitive decline (27). The natural menopause transition takes place more smoothly. Observational studies have shown that a natural transition to menopause is not associated with significant changes in cognitive abilities (16). However, both natural and surgical postmenopausal estrogen therapy does not improve cognitive status. Therefore, the mechanisms about menopause and cognitive status remain unclear.

Sleep problems are quite common in menopausal women. Poor sleep quality and insomnia are the main sleep problems in menopause (28). The levels of vasomotor symptoms and hormonal changes in postmenopausal women may affect insomnia symptoms (29). Studies have shown that surgical menopause can cause serious sleep disorders in women (30). In a recent study, Cho et. al. showed that

sleep disorders were 2.13 times more common in women with surgical menopause than in women with natural menopause (29). Similarly, in our study, significant sleeping disorders (insomnia, daytime fatigue and sleepiness) were detected in patients who underwent oophorectomy together with hysterectomy (34.5% vs. 7.8%). Since sleep quality is more affected in women who have undergone surgical menopause, it seems necessary to evaluate them in terms of sleep disorders in their postoperative follow-up.

Another finding of this study was the change in the classification made according to the score obtained in the anxiety scale in both groups. While the preoperative BAI scores were similar in the TAH+BSO and TAH+BS groups, the postoperative BAI score was significantly higher in the TAH+BSO group. Menopause draws attention as a critical transition period in a woman's life due to biological, social and psychological changes. Since the process occurs suddenly in surgical menopause, menopausal symptoms are more severe. This can trigger anxiety (31). In our study, a significant correlation was also observed between BAI score and menopausal symptoms (such as vasomotor symptoms, vaginal dryness and/or dyspareunia, memory and sleep problems). Many studies have shown a positive relationship between vasomotor symptoms and depressive complaints during the transition to menopause (32,33). However, some other studies suggest that anxiety symptoms are not clearly related to any specific stage of menopause (34). In another study, it was showed that women under the age of 46 who underwent oophorectomy had higher depression scores after surgery (24).

Recent studies have shown that clinical practice is beginning to change as our understanding of the possible long-term health risks of elective oophorectomy and the potential benefits of elective oophorectomy in premenopausal patients (35). For benign disease, the opinion that the decision to leave or remove the tubes and ovaries should be made by considering the long-term health effects and not removing the ovaries in cases under the age of 51 has been presented over the years (36).

There were some limitations of this study. Firstly, the study was conducted only on women who had an abdominal hysterectomy. Previous studies investigated whether sexual function results after hysterectomy were affected by the procedure used (25). However, data comparing the results of sexual function outcomes between vaginal, laparoscopic, and transabdominal hysterectomy are limited. Our study was conducted with a single center and a limited number of patients. The generalizability of the study is limited. Multicenter studies with larger patient populations are needed.

CONCLUSION

In conclusion, vasomotor symptoms, vaginal dryness and/or dyspareunia, memory and sleeping problems, and anxiety levels were significantly higher in patients who underwent bilateral salpingo-ophorectomy with hysterectomy compared to patients who underwent only

hysterectomy and bilateral salpingectomy. More studies are needed to balance the health risks and benefits of prophylactic bilateral oophorectomy performed to reduce the risk of ovarian benign pathologies and cancer.

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Conflict of Interest: *The authors declare that they have no competing interest.*

Ethical approval: *This study was approved by the University of Health Sciences Tepecik Training and Research Hospital Ethics Committee (approval number: 2021/10-20).*

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