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**Tubo-ovarian abscess in postmenopausal patients: a tertiary single center experience****Postmenopozal hastalarda tubaovaryan apse: üçüncü basamak bir merkezde deneyimi**UTKU AKGOR<sup>1</sup>MURAT GOZUKUCUK<sup>1</sup> Orcid ID:0000-0003-1377-2651 Orcid ID:0000-0002-4418-7570<sup>1</sup> Department of Gynecologic Oncology, Ankara Education and Research Hospital, Ankara, Turkey**ÖZ**

**Amaç:** Çalışmanın amacı, üçüncü basamak bir merkezde postmenopozal kadınlarda tubaovaryan apse (TOA) yönetimi ve sonuçları ilgili deneyimi ortaya koymaktır.

**Gereç ve Yöntem:** Bu çalışma Ocak 2012 ile Haziran 2021 arasında yapılmıştır. Hastanede yatmış olan 127 TOA olgusu tıbbi kayıtlardan belirlendi ve geriye dönük olarak incelendi. Toplanan veriler yaş, doğum sayısı, menopoz durumu, rahim içi araç (RIA) kullanımı, sigara öyküsü, geçirilmiş cerrahi işlem, radyolojik bulgular, tıbbi ve cerrahi tedaviler, laboratuvar bulguları, patoloji ve hastanede kalış süresini içermektedir.

**Bulgular:** Tüm hastaların ortalama yaşı  $39.2 \pm 9.8$  yılı ve 22 (%17.3) hasta postmenopozal idi. Postmenopozal hastalarda cerrahi müdahale ihtiyacı, RIA kullanımı, hastanede kalış süresi ve nihayi patolojide malignite tanısı anlamlı olarak daha yüksek bulundu ( $p < 0.05$ ). Postmenopozal hastalarda cerrahi karar için geçen sürenin daha kısa olduğu görüldü ( $p < 0.05$ ). Hastaların menopoz durumlarına göre radyolojik ve laboratuvar bulguları benzerdi. Postmenopozal hastalarda, ortalama tanı yaşı, hastanede kalış süresi, apse boyut ve hacmi cerrahi uygulanan hastalarda sadece medikal tedavi alanlara göre anlamlı olarak daha yüksek bulunmuştur ( $p < 0.05$ ).

**Sonuç:** Postmenopozal TOA'lı hastalar, daha fazla komorbiditeye sahip olma, uzamış RIA kullanım öyküsü ve daha yüksek gizli malignite olasılığı açısından premenopozal dönemdeki hastalardan farklıdır. Menapoz sonrası hastalar daha çok ameliyat olma eğilimindedir, ancak klinik uygulamada bireyselleştirilmiş tedavi stratejileri gerekebilir.

**Anahtar Kelimeler:** Tubaovaryan apse, pelvik inflamatuvar hastalık, menopoz.

**ABSTRACT**

**Objective:** The purpose of the present study was to reveal the experience of a single tertiary center in management and outcomes of tubo-ovarian abscess (TOA) in postmenopausal patients.

**Materials and Methods:** The present study was conducted between January 2012 and June 2021. One hundred and twenty-seven hospitalized cases of TOA were identified from the medical records and retrospectively reviewed. Collected data included age, parity, menopausal status, intrauterine device (IUD) usage, smoking history, prior procedure, radiological findings, medical and surgical treatments, laboratory findings, pathology, and length of hospital stay.

**Results:** The study population included 22 (17.3 %) and 103 (82.7 %) patients identified as postmenopausal and premenopausal, respectively. The need for surgical intervention, the intrauterine device usage, duration of hospitalization, and malignancy at final pathology were significantly higher in postmenopausal patients. The mean day for surgery was earlier in postmenopausal patients. The radiological and laboratory findings were similar according to the menopausal status of patients. Among postmenopausal patients, the mean age at diagnosis, the duration of hospitalization, abscess size, and abscess volume were significantly higher in patients who also underwent surgery compared to those receiving only medical treatment.

**Conclusion:** Postmenopausal patients with TOA differ from traditional abscesses regarding having more comorbidities, a history of extended IUD usage, and a higher possibility of occult malignancies. Postmenopausal patients are more tend to underwent surgeries, however, individualized treatment strategies may be required in clinical practice.

**Keywords:** Tubo-ovarian abscess, pelvic inflammatory disease, menopause.

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## INTRODUCTION

The tubo-ovarian abscess (TOA) is a complex infectious mass involving the fallopian tube, ovary, and, sometimes other adjacent pelvic organs. TOAs are traditionally seen in reproductive-age patients and commonly occur as a sequela of pelvic inflammatory disease (PID)(1). The treatment of this potentially life-threatening condition consists of antibiotics with the addition of surgery in selected cases (2). TOAs less frequently occur in patients of postmenopausal age with the incidence reported in the literature ranging between 6–18%(3, 4), besides the management and risk factors of TOAs in postmenopausal patients diverges from the reproductive ages.

In postmenopausal patients, the surgical approach comes to the forefront due to the decrease in the need for fertility preservation and the malignant potential underlying TOA (2, 5). Nevertheless, for cases which has a low probability of malignancy, medical treatment is a reasonable option. The prevalence of malignancy accompanying TOA in postmenopausal patients is unclear, and this ratio differs among several studies. Furthermore, most of the knowledge about postmenopausal patients with TOA is based on case reports, and single institutional series.

The aim of the present study is to define the presentation, clinical characteristics and outcomes of postmenopausal patients with TOA. It is also aimed to present the variables affecting decision-making in treatment options among postmenopausal patients.

## MATERIALS AND METHODS

The present study was conducted between January 2012, and June 2021, at the Departments of Obstetrics and Gynecology at Ankara Training and Research Hospital. One hundred and twenty-seven cases of TOA were identified from the medical records and retrospectively reviewed. The study was approved by the local ethical committee, and all patients signed an informed consent which allows the institution to use their data.

Demographic and clinical variables of hospitalized patients were obtained from recorded via medical files and computer-based screening. Collected data included age, parity, menopausal status, intrauterine device (IUD) usage, smoking history, prior procedure, radiological findings, medical and surgical treatments, laboratory findings, pathology, and length of hospital stay.

TOA was diagnosed with the findings of PID by cervical and adnexal sensitiveness on vaginal examination, abdominal pain, and  $\geq 1$  additional minor criteria as  $\geq 38^\circ\text{C}$  fever, leukocyte  $>10.000/\text{mL}$ , erythrocyte sedimentation rate (ESR)  $> 15\text{mm}/\text{hour}$ . And the radiological findings play a vital role in the diagnosis. The entity of adnexal mass needs to be revealed by ultrasonography, computed tomography, or magnetic resonance imaging(6).

At first, the patients were treated with 600 mg clindamycin (4x1 daily) and 80 mg gentamicin (3x1 daily) or with 1 g ceftriaxone (1x1 daily) and 500 mg metronidazole (2 x 1 daily). The intravenous antibiotic treatment was administered for at least 4 days and continued 24-48 hours after the clinical response was observed. Later on, oral 100 mg doxycycline, per 2 times a day was given for 2 weeks. Patients who had failed to respond to medical treatment underwent surgical treatment.

Statistical analysis was performed using SPSS Version 23.0 for Windows (SPSS Inc., Chicago, IL). The normality of the distribution of continuous variables was assessed with the Kolmogorov–Smirnov test. Mean, median, and standard deviation values were calculated where applicable. The t-test was used for normally distributed variables, and the Mann–Whitney U test was used for abnormally distributed variables. The comparison of categorical variables was undertaken using Pearson's chi-square and Fisher's exact tests. A p-value of  $< 0.05$  was considered to be statistically significant.

## RESULTS

The mean age of 127 patients was  $39.2 \pm 9.8$  years. The study population included 22 (17.3 %) and 103 (82.7 %) patients identified as postmenopausal and premenopausal, respectively. Clinical characteristics of patients with TOA according to the menopausal status are given in Table 1.

**Table 1.** Clinical characteristics of patients according to the menopausal status

Clinical characteristics	Premenopausal (n=105)	Postmenopausal (n=22)	<i>p</i>
Age (y) at diagnosis, mean ( $\pm$ SD)	35.8 $\pm$ 9.8	55.1 $\pm$ 7.5	<0.05
Contributing medical factors, n (%)	10 (9.5)	6 (27.3)	<0.05
Parity, mean $\pm$ sd	2.37 $\pm$ 1.1	2.72 $\pm$ 0.5	0.53
Current smoker	28 (26.7)	7 (31.8)	0.28
IUD usage	25 (23.8)	9 (40.9)	<0.05
Previous pelvic surgery	45 (42.8)	8 (36.4)	0.25
Fever ( $\geq$ 38°C)	24 (22.8)	5 (27.2)	0.32
Surgical intervention	28 (26.7)	12 (54.5)	<0.05
The mean day for surgery ( $\pm$ SD)	3.08 $\pm$ 4.87	1.96 $\pm$ 1.53	<0.05
Malignancy at final pathology	1 (0.9)	2 (9.1)	<0.05
Length of hospital stay (day) ( $\pm$ SD)	6.15 $\pm$ 3.57	8.90 $\pm$ 6.65	<0.05

IUD: Intrauterine device

The age, contributing medical factors, a mean number of parity, history of previous pelvic surgery, current tobacco usage, and fever were similar between the premenopausal and the postmenopausal groups. The need for surgical intervention, the IUD usage, duration of hospitalization, and malignancy at final pathology were significantly higher in postmenopausal patients ( $p < 0.05$ ). The mean day for surgery was earlier in postmenopausal patients ( $p < 0.05$ ).

As an initial medical treatment ceftriaxone/metronidazole was administered in 52.7% ( $n = 67$ ) of all patients and gentamicin/clindamycin was administered in 47.3% ( $n = 60$ ). There was no statistically significant difference between the different treatments groups in terms of the medical treatments. Regarding surgical treatments, total hysterectomy plus bilateral salpingo-oophorectomy was performed in 15 cases (37.5%), salpingo-oophorectomy was performed in 14 cases (35%), abscess drainage was performed in 4 cases (10%), salpingectomy was performed in 6 cases (15%) and cystectomy was performed in a case (2.5%).

The laboratory and radiological findings according to the menopausal status are summarized in Table 2.

**Table 2.** Radiological and laboratory findings of patients according to the menopausal status

Variables	Premenopausal (n=105)	Postmenopausal (n=22)	<i>p</i>
CRP level (mg/L), mean ( $\pm$ SD)	47 $\pm$ 10.2	54 $\pm$ 9.6	0.76
ESR (mm/h), mean ( $\pm$ SD)	46 $\pm$ 29.1	49 $\pm$ 13.8	0.35
WBC count (mcL), mean ( $\pm$ SD)	14160 $\pm$ 4870	12970 $\pm$ 5990	0.43
Procalcitonin (ng/mL), median (min-max)	0.4 (0.1- 1.4)	0.4 (0.1- 0.9)	0.54
TOA location, bilaterality, n (%)	25 (23.8)	4 (18.2)	0.11
Abscess size (mm), mean ( $\pm$ SD)	62.3 $\pm$ 18.7	68.1 $\pm$ 13.7	0.23
Abscess volume (cm <sup>3</sup> ) ( $\pm$ SD)	70.8 $\pm$ 62.6	89.4 $\pm$ 71.8	0.15

CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, WBC: white blood cell, min:minimum, max: maximum.

The mean CRP, ESR, WBC, and median procalcitonin counts were similar among premenopausal and postmenopausal patients. The size, volume, and the bilaterality of TOA were also similar according to menopausal status.

Among postmenopausal patients, the mean age at diagnosis, the duration of hospitalization, the median value of abscess size, and abscess volume were significantly higher in patients who also underwent surgery compared to those receiving only medical treatment ( $p < 0.05$ ). Contributing medical factors of patients, the inflammatory laboratory variables including CRP, ESR, the mean count of procalcitonin, and WBC, and the bilaterality of TOA did not differ among these two groups (Table 3).

**Table 3.** Characteristic of postmenopausal patients according to treatment modalities

Variables	Surgery (n=12)	Medical (n=10)	<i>p</i>
Mean age at diagnosis (years)	56.7 $\pm$ 5.7	53.3 $\pm$ 8.6	<0.05
Contributing medical factors, n (%)	4 (33)	2 (20)	0.16
Fever, mean°C ( $\pm$ SD)	37,4 $\pm$ 0,81	37,2 $\pm$ 0,77	0.57
CRP level (mg/L) ( $\pm$ SD)	59 $\pm$ 6.3	48 $\pm$ 7.3	0.09
ESR (mm/h) ( $\pm$ SD)	49 $\pm$ 13.8	46 $\pm$ 20.7	0.32
WBC count (mcL) ( $\pm$ SD)	13490 $\pm$ 6650	12470 $\pm$ 5230	0.63
Procalcitonin (ng/mL)	0.32 $\pm$ 0.3	0.29 $\pm$ 0.2	0.55
TOA location, bilaterality, n (%)	2 (16.7)	2 (20)	0.71
Abscess size (mm) median (min-max)	98.3(6 -16.4)	5.1(2-13.1)	<0.05
Abscess volume (cm <sup>3</sup> ) ( $\pm$ SD)	169.2 $\pm$ 71.3	89.4 $\pm$ 71.8	<0.05
Length of hospital stay (day) ( $\pm$ SD)	10.1 $\pm$ 5.9	6.7 $\pm$ 5.4	<0.05

CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, WBC: white blood cell, TOA: tubo ovarian abscess, min:minimum, max: maximum.

## DISCUSSION

### Discussion

TOA is a serious and potentially life-threatening complication of PID. It is predominantly seen in sexually active women of the reproductive age. Mostly, many reports suggested that around 10% of TOAs are seen in postmenopausal ages. Although the incidence of postmenopausal patients in our study was slightly higher with 17.3 %, it was within the range of 1.7% to 27% defined in the available literature (7-9).

The main risk factors for a TOA are to be in reproductive ages, having multiple sexual partners, and history of PID. Unlike reproductive ages, having comorbidities as diabetes mellitus (DM), pelvic surgical interventions, and extended time IUD are mostly described risk factors for postmenopausal TOAs (2, 10-12). In the present study, 6 (27.3%) of 22 postmenopausal patients had contributing medical factors, this ratio is significantly lower in premenopausal patients. Therefore there were many studies reporting different rates of comorbidities up to 66% (11, 13). In the largest case series of 61 postmenopausal TOAs, diverticular disease is the most commonly described contributing medical factor (13). This defines the significance of becoming aware of the diverticular disease that may present as a TOA particularly on the left side. In the present study, DM is recorded as the main TOA risk factor among all comorbidities.

Lipscomb et al. showed that 45% of postmenopausal patients had a history of previous pelvic surgery in whom mostly had endometrial sampling(14). Gockley et al. reported a higher rate of 37% (13). In the present study, the incidence of previous pelvic surgery was higher (36.4%), which is in line with the findings of studies described above, however, this figure was similar among the premenopausal and postmenopausal patients. Therefore, our study does not conclude that the history of previous surgery is a risk factor specific to only postmenopausal patients for TOA. Moreover, our study revealed neither radiological nor any laboratory findings such as inflammatory markers were useful to distinguish the patients according to their menopausal status.

In patients with postmenopausal TOA, the possibility of malignancy should not be ignored, and for this group of patients, the surgical exploration was suggested rather than the medical treatments or any drainage procedures. In the present study, we had performed around double times more surgery in postmenopausal patients to diagnose a significantly higher rate

of malignancy with a 9.1% incidence. Our finding is consistent with a systematic review suggesting malignancy varied from 2.5% to 47% in postmenopausal patients with TOA, and the rate of performing surgery was found to be higher in postmenopausal patients (13). Moreover, we also showed that the decision-making of surgery is earlier in postmenopausal patients, and among all postmenopausal patients that underwent surgery are significantly older than the medically treated patients.

Several studies have reported the impact of TOA size on the need for surgery, these studies revealed the necessity of surgery increased with the growing size of adnexal masses(15, 16). Our findings were consistent with these studies. Besides, these studies showed the increase in TOA size is also associated with worse outcomes and a longer duration of hospitalization. And a length of stay in hospital may lead to surgical interventions(17, 18). In the present study, the mean length of hospital stay was higher particularly for postmenopausal patients that underwent surgery. In this context, surgery increased the length of the hospital stay either in postmenopausal or all patients.

There are weaknesses inherent to the retrospective design of present study, and due to the rarity of TOAs in postmenopausal patients, there may be restrictions in the number of patients for analysis, and further analyses with more sample sizes may be required to reach robust conclusions.

In conclusion, postmenopausal patients with TOA differ from traditional abscesses regarding risk factors such as contributing medical factors, a history of extended IUD usage, and a higher possibility of occult malignancies. Currently, many surgeons have advocated surgical treatments rather than medical treatments, nevertheless, some may individualize treatment strategies in clinical practice.

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None

### Conflict of Interest

The authors have no conflicts of interest.

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