Adnexectomy or Adnexectomy Plus Hysterectomy for Postmenopausal Low-Risk Ovarian Cyst

Original Article

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ABSTRACT

Objective: To determine surgical efficacy and outcome of hysterectomy combined with adnexectomy versus adnexectomy either unilateral or bilateral alone in treatment of postmenopausal women with low-risk ovarian cyst.
Design: Prospective cohort study
Setting: Mansoura University Hospitals
Patients: 40 postmenopausal women with an ovarian cyst who underwent adnexectomy alone (either unilateral or bilateral) or hysterectomy combined with adnexectomy (either unilateral or bilateral) in the Department of Obstetrics and Gynecology, Mansoura University Hospital.
Interventions: Patients were divided into two groups; Group 1 (n = 20) adnexectomy alone and group 2 (n = 20) adnexectomy combined with hysterectomy in a 1:1 ratio
Measurements and Main Results: There was a significant difference between both groups in the use of general anesthesia, operation time, need for blood transfusion, blood loss, mean change in hemoglobin and hematocrit before and after operation, frequency of postoperative complications, length of hospital stay, and postoperative Quality of life of patients, impairment of sexual life, but no statistically significant difference between the studied groups in terms of pathology results.
Conclusion: A statistical difference between both groups was found in intraoperative and postoperative complications, which were more common in the hysterectomy group, and sexual dysfunction was more common in this group than in the adnexectomy group. All of this made adnexectomy alone as effective as hysterectomy in treating postmenopausal ovarian cysts with low risk and much fewer complications.

Key Words: Adnexectomy; hysterectomy; ovarian cyst; postmenopausal.

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INTRODUCTION

Ovarian cysts are common in postmenopausal women. The incidence is between 5% and 17% and the majority are benign and less than 1% of them are malignant[1].

Low risk benign cysts are defined as cysts which has risk of malignancy index < 200 according to Royal College of Obstetricians and Gynaecologists (RCOG) and can be treated either conservatively or surgically[1].

Since postmenopausal women are usually older and suffer from medical diseases such as high blood pressure, diabetes, heart disease and other age-related diseases , they are more susceptible to perioperative complications[2]. Even after cystectomy or unilateral adnexectomy, the recurrence rate is only 3.5% even for borderline ovarian tumors where more aggressive maneuvers for treatment were suspected[3]. So, with the fact that the removal of a seemingly normal organ, even if it no longer functions after increasing age, is not logical and a good preoperative assessment of the cyst type through the use of highly predictive, sensitive and specific indices, low-risk benign postmenopausal ovarian cysts must and can be treated in this particular age group, especially if the patient declines the option of hysterectomy with the lowest risk and most effective method of treatment. In this case, a hysterectomy accompanied by an adnexectomy carries a higher risk and almost the same effectiveness as adnexectomy alone.

Limited studies have been conducted on the low-risk treatment of ovarian cysts in Egyptian postmenopausal women, and there is still no clear clinical decision on whether to use conservative treatment with regular follow-up, which is very difficult to apply in Egypt, or surgical

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treatment either adnexectomy alone or adnexectomy with hysterectomy.

PATIENTS AND METHODS

A prospective cohort study was conducted in Mansoura University Hospital, after obtaining approval from the Mansoura University Institutional Review Board (Code No.: MS.21.02. 1369.R1.R2; Date: 03/17/2021) on 40 postmenopausal women with a low-risk ovarian cyst admitted from the outpatient clinic of OB/GYN Center to the OB/GYN Departments of the Main University Hospital of Mansoura from March 2021 to May 2023.

Patients with low-risk ovarian cysts according to RCOG guidelines: CA125 levels < 35 IU/ml, malignancy risk index 1 (RMI 1) < 200 and/or simple rules of the International Ovarian Tumor Analysis (IOTA SR) cysts that have one or more benign criteria with normal uterus will be included in the study. Patients with suspected high-risk ovarian cysts according to RCOG: CA125 ≥ 35 IU/ml or RMI1 ≥ 200, intraoperative malignant criteria, any of the malignancy criteria IOTA SR, history of breast or colonic cancer or history of chemotherapy or radiotherapy, and who refused to participate in the study were excluded from this study.

After discussions with selected patients about possible surgical procedures, either an adnexectomy only or a hysterectomy during the adnexectomy, the patients were divided into two equal groups; Group A: 20 patients who underwent adnexectomy alone and Group B: 20 patients who underwent adnexectomy along with hysterectomy and subsequent written informed consent were obtained from the participated patients.

Methods

Preoperative clinical data and investigations:

1. Full personal, obstetric, menstrual, past, and family history.
2. Complete physical examination.
3. Transabdominal and transvaginal ultrasound scan were performed. A transvaginal ultrasound scan was performed using (Alpinion machine model No. E-CUBE5) multifrequency probe. Cyst criteria according to IOTA SR[4]:

Benign (B) criteria include

1. Unilocular cyst.
2. Solid component, but <7mm.
3. Acoustic shadows.
4. Smooth multilocular tumor <100mm.
5. No blood flows.

Malignant (M) criteria include

1. Irregular solid tumor.
2. Ascites.
3. At least 4 papillary structures.
4. Irregular multilocular tumor >100mm.
5. Very strong flow.

4. Laboratory blood tests: serum CA125 levels, a complete blood count (CBC), hemoglobin (Hb) and hematocrit (Hct) values on the day of admission.
5. Calculate RMI 1 for all participant ovarian cysts as[1,5]:

It is derived from the menopausal state (M), CA125 level (iu/ml), and ultrasound score (U) as following:

RMI 1= U × M × CA125

* Multilocular cysts, solid regions, metastases, ascites, and bilateral lesions all result in a score of one point for the ultrasound result. U = 0 corresponds to an ultrasound score of 0, U = 1 to a score of 1, and U = 3 corresponds to a score of 2–5.

* Menopause state is rated 1 for premenopausal and 3 for postmenopausal.

Operative data

During surgery, we recorded:

1. The type of anesthesia used for the patient was either general or spinal.
2. Total operative duration time (skin to skin).
3. Intraoperative pelvic organ injury as bowel, ureter, and bladder.
4. Need for Intraoperative blood transfusion.
5. Intraoperative estimated blood loss in (ml):

Determined visually by observing and recording the amount of blood suctioned in canisters during operation and the amount of blood lost into surgical pads and sponges by attending surgeons and anthologist then using gravimetric method by weighing surgical sponges and laparotomy pads before and after use. The difference in weight is to be the volume of blood lost ,one gram increase in the weight of a blood soaked surgical gauze is equal to one milliliter of blood lost[6].

The two amounts of blood, the one observed and the one that was calculated are summed to give the total amount of estimated blood loss during the surgery in (ml).

Postoperative data

Postoperative management was the same in both groups and we recorded the following:

1. Postoperative CBC, Hb and Hct values after 6 hours to be compared with that of the preoperative values.
2. The post-operative complications: fever, paralytic ileus, pelvic hematoma, wound infection, deep vein thrombosis, blood transfusion after surgery and deaths.
3. The post-operative hospital staying in days.
4. The final post operative pathology result and compared to preoperative assessment of the cyst for each patient.
5. Postoperative assessment of patient's sexual life affection in both groups 6 months after the surgery and if the surgery was negative, positive & in what form or no effect on patients' sexual life.

Sample size calculation

Sample size calculation was based on incidence of mean blood loss among cases with adnexectomy and with hysterectomy as interventions for ovarian cyst retrieved from previous research[7].

Using G*power version 3.0.10 to calculate sample size based on effect size of 1.43, 2-tailed test, α error =0.05 and power = 90.0%, the total calculated sample size will be 36 (18 in each group) and by adding 5% to compensate for drop out then total sample size will be 40 (20 in each group).

Interpreting data and performing statistical analysis

SPSS software (SPSS Inc., PASW statistics for Windows, version 25) was used to analyze the data. Illinois: SPSS Inc. Percentage and number were used to describe the qualitative data. In the case of non-normally distributed data, the quantitative values were represented using mean± and median (minimum and maximum). When utilizing the Kolmogrov-Smirnov test to verify normality, the standard deviation for data that is normally distributed. The acquired results were deemed significant at the (≤0.05) level. When applicable, Chi-Square, Fischer exact test, and Monte Carlo tests were employed to compare the qualitative data between the groups. The Mann Whitney U exam was employed to compare non-normally distributed data between the two study groups. For normally distributed data, the student t test was utilized to compare two independent groups.

RESULTS

The study flowchart (Figure 1) showed that 75 postmenopausal women with a diagnosis of ovarian cyst admitted from the outpatient clinic of the obstetrics and gynecology center to the inpatient obstetrics and gynecology department of the Mansoura Main University Hospital were assessed for their eligibility to participate in the study; We excluded 35 cases that did not meet the inclusion criteria and divided the other 40 cases with low-risk ovarian cysts into two groups. Group A: adnexectomy alone (20 patients) and group B: adnexectomy with hysterectomy (20 patients).

No statistically significant difference was found between the studied groups regarding demographic characteristics. The mean ± SD age in group A was 52.2 ± 6.71 years, while in group B it was 56.1 ± 9.18 years. The BMI average of group A was 29.87 ± 4.10, with an average duration since menopause of 4.53 ± 5.56 years versus 6.59 ± 8.03 years and mean BMI 27.90 ± 5.14 for group B (Table 1)

Studied groups as regard medical, surgical, and obstetric history showed non-statistically significant difference in between. Median gravidity was 4 and 3 for groups A and B. Median parity was 4 and 3 for groups A and B. From group A; 35% have an abortion, compared to 16.7% in Group B. The medical history of the groups showed a frequency of hypertension (30% vs. 35%), bronchial asthma (5% vs. 10%), hypothyroidism (5% vs. 5%), heart disease (10% vs. 5%), diabetes (25% vs 35%), epilepsy (0% vs 5%), increased intracranial pressure (5% vs 0%), ITP (0% vs 5%), uncompensated liver disease (0% vs 5%) and HCV-positive patients (20). % vs. 20%) for Group A vs. Group B. On the other hand, surgical history showed an incidence of laparotomy (5% vs. 15%), hysterotomy (10% vs. 5%), tubal ligation (5% vs. 10%) and open-heart surgery (5% vs. 0%)., thyroidectomy (5% vs. 10%), hernioplasty (5% vs. 5%), appendectomy (15% vs. 10%), and cholecystectomy (5% vs. 10%) for group A and group B, respectively (Table 2).

There is no statistically significant difference between the groups under study as regard to CA125 levels, cyst

size, side, IOTA benign criteria, US score and RMI. Mean CA125 level was 11.39 ± 6.90 vs 15.41±9.81 for group A & B, respectively. Median cyst width is 9 vs 10 for groups A & B, median cyst length is 7.5& 8 for groups A & B, respectively. Cyst side is distributed as following; 55% right, 40% left and 5% bilateral for group A versus 50% & 50% right & left sides respectively for group B. IOTA benign criteria score was 10%, 65% &25% score 1, 2& 3, respectively for group A versus 20%, 45% & 35% for group B. RMI Us score was distributed as following among 0, 1, 2 & 3 score ; 20%, 70%, 5%, 5% versus 50%, 45%, 0 & 5% , respectively for groups A & B. Median RMI is 22.2 ranged from 0 to 144 versus 9.45 ranging from 0 to 105 for groups A& B, respectively (Table 3)

A statistically significant variation was found between groups in type of anesthesia, organ injury and blood transfusion. Under Group A, 15% general anesthesia compared to 100% in group B. Group B was found to have higher rates of blood transfusion compared to group A (20% versus 5%), respectively. In group A there was 1 case (5%) of intestinal injury but in group B there were 4 cases (20%) of organ injury (2 for intestinal & 2 for urinary bladder). There was a statistically significant difference between both groups in the mean operative time (1.25 hours in group B vs. 2 hours in group A) and the mean estimated blood loss (350.0 ± 149.97 ml in group B vs. 150.25 ± 49.54 ml in group A) (Table 4).

A non-statistically significant difference was found between the studied groups regarding hemoglobin levels and hematocrit levels. A statistically significant change in mean hemoglobin and hematocrit with a higher percentage of change postoperatively in Group B than in Group A. The mean percentage change in hemoglobin was 5.7% versus 12.7% and the mean percentage change in hematocrit was 7, 2% versus 14.2% for groups A and B respectively (Table 5).

There is no mortality in either group, but group B experiences greater frequency of each complication as well as the total complication incidence than group A, but with no statistical significance difference. In group B, 10% (2 cases) had pelvic hematoma, (3 cases) 15% compared to (1 case) 5% needed blood transfusion; (5 cases) 25% compared to (2 cases) 10% had fever; (2 cases) 10% compared to 0% had paralytic ileus, (4 cases) 20% compared to (1 case) 5% for wound infection (SSI) and (1 cases) 5% compared to 0% for deep vein thrombosis. Postoperative hospital staying duration was longer for group B than A (2.80±1.96 vs 7.65±2.64) (Table 6).

No statistically significant difference between studied groups as regard results of pathology. All cysts of group A were benign in comparison to 95% of group B cysts with predominance of serous cyst adenoma type followed by mucinous cystadenoma in both groups. Post-operative sexual life demonstrates statistically significant difference between studied groups; group B was more affected by the operation than group A with more positive impact of surgery with group A higher than group B (42.1% versus 5.6%) and more negative impact of surgery with group B more than group A (50% versus 5.3%), group A in the form of dyspareunia only but group B in the form of loss of orgasm &/or dyspareunia. (Table 7).

Table 1: Demographic characteristics of studied groups

	Group A N =20 (%)	Group B N = 20 (%)	Significance test
Age (in years) (Mean ± SD)	52.20 ± 6.71	56.10 ± 9.18	t=1.53, p=0.133
Occupation			
• Not working	13 (65.0)	18 (90.0)	^{2}=3.58
• Working	7 (35.0)	2 (10.0)	p=0.06
BMI (Kg/m^2)	29.87 ± 4.10	27.90 ± 5.14	t=1.34, p=0.188
Residency			
• Urban	13 (65.0)	15 (75.0)	^{2}=0.476
• Rural	7 (35.0)	5 (25.0)	p=0.490
Marital status			
• Single	0	2 (10)	MC=2.18
• Married	14(70)	13(65)	P=0.536
• Widow	4(20)	3(15)	
• Divorced	2(10)	2(10)	
Menopause for / year Mean ±SD	4.53±5.56	6.95±8.03	z=0.632 p=0.528

est Chi -Square test, MC: Monte Carlo test

FET: Fischer exact test, Z: Mann Whitney U test, MC: Monte Carlo test

Table 2: Medical, Surgical and Obstetric history of studied groups

	Group A n=20 (%)	Group B n=20 (%)	Significance test
Gravidity median (min-max)	4.0 (1.0-6.0)	3.00.0-6.0))	z=1.64, p=0.102
Parity median (min-max)	4.01.0-6.0))	3.00.0-6.0))	z=1.81, p=0.07
Abortion	7 (35.0)	3 (16.7)	^{2}=1.64, p=0.200
CS Section			
• Previous 1 cs	6 (60)	1 (10)	MC=7.57
• Previous 2 cs	1 (10)	3 (30)	P=0.056
• Previous 3 cs	1 (10)	5 (50)	
• Previous 4 cs	2 (20)	1 (10)	
Medical History			
• Hypertension	6 (30)	7 (35)	MC=8.03
• Bronchial asthma	1 (5)	2 (10)	P=0.07
• Hypothyroidism	1 (5)	1 (5)	
• Cardiac illness	2 (10)	1 (5)	
• Diabetic	5 (25)	7 (35)	
• Epileptic	0	1 (5)	
• Elevated intracranial pressure	1 (5)	0	
• ITP	0	1 (5)	
• Uncompensated hepatic illness	0	1 (5)	
• HCV +ve patients	4 (20)	4 (20)	
Surgical History			
• Laparotomy	1 (5)	3 (15)	MC=7.65
• Hysterotomy	2 (10)	1 (5)	P=0.063
• Tubal Ligation	1 (5)	2 (10)	
• Open Heart	1(5)	0	
• Thyroidectomy	1 (5)	2 (10)	
• Hernioplasty	1 (5)	1 (5)	
• Appendectomy	3 (15)	2 (10)	
• cholecystectomy	1 (5)	2 (10)	

Z: Mann Whitney U test, MC: Monte Carlo test χ^2; Chi-Square test

Table 3: Comparison of Cyst Evaluation between enrolled groups

	Group A n=20 (%)	Group B n=20 (%)	test of significance
CA-125 Mean ± SD	11.39±6.90	15.41±9.81	t=1.5 p=0.142
Cyst size			
• Width	9(6-21)	10(4-30)	z=0.380, p=0.704
• Length	7.5(4-18)	8(4-30)	z=0.014, p=0.989
Cyst side			
• Right	11(55.0)	10(50.0)	MC=1.27
• Left	8(40.0)	10(50.0)	p=0.530
• Bilateral	1(5.0)	0	
IOTA benign criteria score			
• 1	2(10.0)	4(20.0)	MC=1.73
• 2	13(65.0)	9(45.0)	P=0.422
• 3	5(25.0)	7(35.0)	
RMI US score			
• 0	4(20)	10(50)	MC=4.66
• 1	14(70)	9(45)	P=0.199
• 2	1(5)	0	
• 3	1(5)	1(5)	
RMI median (min-max)	22.2(0-144)	9.45(0-105)	z=0.719 p=0.472

z: Mann Whitney U test, MC: Monte Carlo test

Table 4: intraoperative data of studied groups

	Group A n=20(%)	Group B n=20(%)	Significance test
Anesthesia type			
Spinal	17 (85.0)	0	FET=29.56
General	3 (15.0)	20(100)	*P*<0.001*
Organ injury	1 (5) "Intestinal injury"	4 (20) "2 urinary bladder & 2 intestinal injury"	FET=2.06 P=0.342
Blood loss (ml)	150.25 ± 49.54	350.0 ± 149.97	t=5.68 *P* <0.001*
Blood transfusion	1(5)	4(20)	χ^2=13.78 *p*=0.001*
Operative time (hours) Mean ± SD	1.25 ± 0.30	2 ± 0.61	t=12.9 *p* <0.001*

χ^2; Chi-Square test, FET: Fischer exact test *statistically significant

Table 5: comparison of preoperative and postoperative hemoglobin and hematocrit value between studied groups

		Group A n=20(%)	Group B n=20(%)	test of significance
Hb (gm/dl)	Preoperative	12.36±0.79	11.96±1.0	t=1.36 P =0.180
	Postoperative	11.66±0.70	10.44±1.12	t=4.14 P <0.001*
P value		<0.001*	<0.001*	
Mean change		0.7	1.5	
% of change		5.7%	12.7%	0.453
Hct%	Preoperative	37.99 ± 2.55	37.74 ± 3.13	t=0.282 P =0.7709
	Postoperative	35.26 ± 2.29	32.36 ± 3.84	t=2.89 P =0.006*
P value		<0.001*	<0.001*	
Mean change		2.74	5.38	
% of change		7.2%	14.2%	0.482

t: Student t test, * Statistically significant

Table 6: postoperative complications and hospital stay of studied groups

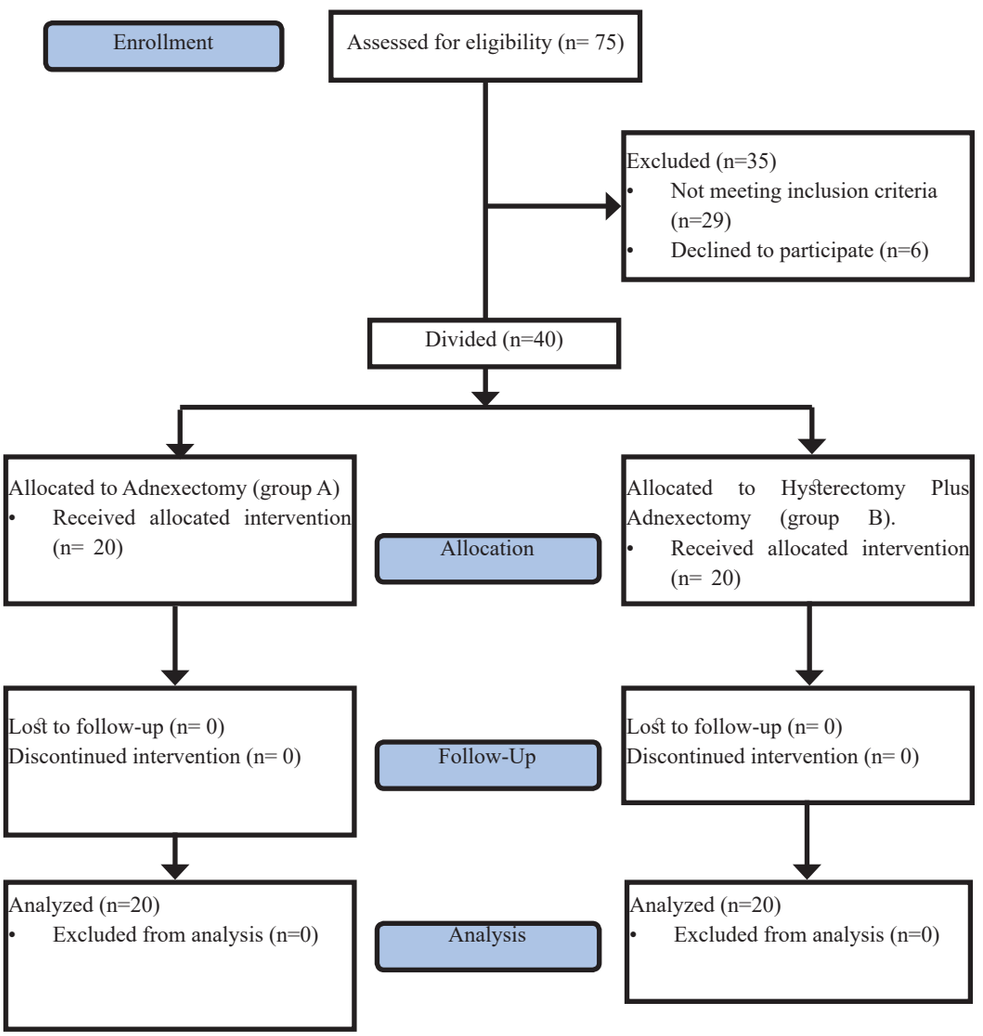
	Group A n=20(%)	Group B n=20(%)	test of significance
Hospital staying (days)	2.80±1.96	7.65±2.64	t=6.59 *p*<0.001*
Complications			
• Fever	2(10.0)	5(25.0)	χ^2=1.56, p=0.212
• Paralytic ileus	0(0.0)	2(10.0)	FET=2.11, P=0.487
• Pelvic hematoma	0(0.0)	2(10.0)	χ^2=2.11, p=0.487
• Wound infection	1(5.0)	4(20.0)	FET=2.06, p=0.342
• DVT	0	1(5.0)	FET=2.06, P=0.342
• Blood transfusion	1(5.0)	3(15.0)	FET=1.11, p=0.292

t: Student t test, χ^2; Chi-Square test, FET: Fischer exact test, *statistically significant

Table 7: histopathology and post-operative sexual life of studied groups

	Group A n=20(%)	Group B n=20(%)	test of significance
Pathology result			
Benign (inflammatory cell sheets)	2(10)	1(5)	MC=5.28
Benign (hemorrhagic cyst)	0	2(10)	P=0.382
Benign dermoid cyst	2(10)	1(5)	
Benign mucinous cystadenoma	4(20)	7(35)	
Benign serous cystadenoma	12(60)	8(40)	
Borderline mucinous cyst	0	1(5)	
Benign	20(100)	19 (95)	FET=1.03
Borderline	0	1(5)	P=1.0
Postoperative sexual life			
Couldn't be reached (excluded)	1	2	MC=13.770
Not affected	4(21.1)	1(5.6)	P=0.003*
Not sexually active	6(31.6)	7(38.9)	
Positive impact	8(42.1)	1(5.6)	
Negative impact	1(5.3)	9(50)	
	"dyspareunia"	" Loss of orgasm 4 & dyspareunia 8 "	

MC: Monte Carlo test, FET: Fischer exact test *Statistically significant



Group B: Adnexectomy Plus Hysterectomy

Fig. 1: Study flow chart

DISCUSSION

In Egypt, there is no clear clinical consensus among gynecologists on the most appropriate treatment options for low-risk ovarian cysts in postmenopausal women, either conservative treatment with difficulty in regular follow-up or even surgical adnexectomy with or without hysterectomy. This ambiguity leads us to evaluate the effectiveness of adnexectomy alone versus hysterectomy combined with adnexectomy, which carries a higher surgical risk but is almost as effective in treating low-risk ovarian cysts in postmenopausal women.

Our study exhibited that effectiveness of adnexectomy alone in treating postmenopausal low risk ovarian cysts is the same as hysterectomy combined with adnexectomy with much lesser complications.

As regarding over all complications in relation to anesthesia type, our study supports that, using of general anesthesia over spinal anesthesia in operations accompanied more with risks and complications in either intraoperative or postoperative period as in group B which has dominance of general anesthesia usage, has a higher rate of complications in both periods, generally.

In contrary, Romanova *et al*.[8] study declared that spinal and general anesthesia have similar adverse effect on patients having pelvic surgery with no influence on complications .But our results are constant with Chen *et al*.[9] those indicating benefits of using spinal over general anesthesia and correspondence of general anesthesia with higher complication rates and longer postoperative hospital staying.

Over all complications in relation to operation type, complications rate is higher with hysterectomy group (group B) more than adnexectomy group (group A) according to our study and that supported with a lot of studies as Collins, E., *et al*.[10] that confirm hysterectomy is more risky operation accompanied with more over all complications than adnexectomy alone.

Intraoperative mean duration for hysterectomy in our study is much longer than that of adnexectomy (2±0.61 versus 1.25±0.30 hour) as hysterectomy more complex surgery.

Increasing mean operative duration is strongly related to complication rate as in our study the longer mean operative duration group B (hysterectomy group) has higher rate of complications than group A (adnexectomy group). Also, operative duration was observed to be longer in patients with history for pelvic surgeries as for myomectomy, salpingectomy for ectopic, CS section or exploration in either group.

Cheng, H., *et al*.[11] meta-analysis support that fact of increasing operative duration will increase complications.

But that fact is the opposite to Shtarbanov *et al*.,[12] which illustrated the operative time as an independent predictor for operative complications.

Estimated mean blood loss during surgery was more with hysterectomy group (group B) than adnexectomy group (group A) with values of (350.0 ± 149.97 versus 150.25 ± 49.54 ml), respectively that made hysterectomy group was more liable for blood transfusion in intraoperative and postoperative periods (5% and 20% incidence) in comparison to adnexectomy group with lower mean postoperative Hb and Hct, and higher mean change for both of them among hysterectomy group than adnexectomy group (1.5 and 5.38) versus (0.7 and 2.74), respectively. Blood loss in either group, observed to be more with patients with adhesions due to previous pelvic surgery.

The frequency of blood transfusion was approximately 20% in the intraoperative period and 15% in the postoperative period in the hysterectomy group, but in the adnexectomy group the incidence was only 5% in both periods. Blood transfusion incidence was less than 5% for adnexectomy as in Tintara and Choobun[13] and it is almost 50% incidence in Madueke-Laveaux, *et al*.,[14] study for hysterectomy.

Complications in the form of organ injuries occurred more frequently in group B than group A as it showed incidence of 20% (4 cases) with group B and 5% (1 case) with group A. Group A injury was urinary bladder injury and group B injury was distributed between urinary bladder and intestinal injury equally 2 cases for each. All cases of both groups have history for pelvic surgeries as for myomectomy, salpingectomy for ectopic, CS section or exploration. Total incidence of organ injury after hysterectomy operation is 1.1% according to Wright, K.N., *et al*.[15] but this was contrary to our results.

Our study showed incidence of surgical site infection (SSI) by about 20% among hysterectomy group, in comparison to 5% among adnexectomy group. Almost all cases of SSI have high BMI and diabetes together. SSI incidence in hysterectomy group is almost the same as Clarke-Pearson and Geller study[16], which has incidence of 22.6%. Tintara and Choobun study[13] showed incidence for SSI after adnexectomy by 3.3% which was almost the same as our results.

Pelvic hematoma occurred after hysterectomy in our study in 10% of patients (2 cases), one of them diagnosed previously with ITP and the other one has uncompensated hepatic illness. Our result was lower than what alleged by Clarke-Pearson and Geller[16].

Febrile morbidity after surgery was defined as a temperature >38°C on 2 consecutive postoperative days, or >39°C on any 1 postoperative day. It occurred in 25% of hysterectomy group and in 10% of adnexectomy group and that is contradicting to what was recorded in Nesrin Varol, *et al*. to be 15.9% after hysterectomy[17] and in Tintara and Choobun study to be 23.1% after adnexectomy[13].

Regarding DVT, our results showed that it occurred only in 5% (1 case) with high BMI in the hysterectomy group. The incidence of DVT after hysterectomy has been reported in most studies by Madueke-Laveaux *et al*.[14] is less than 1% and this contradicted our results.

In our study, the mean hospital stay after hysterectomy was 7.65 day which was longer than adnexectomy group (2.80 day). The mean hospital staying after hysterectomy in Li, Z.L., *et al*.[18] study was 8.5 days which close to our results. In other hand, the mean hospital stay in adnexectomy group in our study was close to what came by Tintara and Choobun[13].

Postoperative ileus occurred in (10%) the hysterectomy group in our study, which had a longer mean length of hospital stay, and was higher than in the adnexectomy group (0%), which had a shorter hospital stay. According to Li, Z.L. *et al*.[18] The incidence of ileus in open hysterectomy is 10.6%. that almost agrees with our result.

Mortality rate for both of our groups was the same (0%) in spite of some researches as Madueke-Laveaux, *et al*.[14] show incidence of only 0.03% mortality after hysterectomy.

Regarding the results of the pathological examination of the cysts, in our studied groups, the most common cyst type was a benign serous cystadenoma, followed by the mucinous cystadenoma cyst type, then dermoid and hemorrhagic cysts. All cysts in both groups were benign, except that one case (5%) in group B had a borderline mucous cyst.

The distribution of ovarian cysts pathology in postmenopausal women is mostly adenomas (serous then mucinous) followed by dermoid then other cyst types according to Rocha and Barcelos[4], and this finding is similar to that of our research.

When examining the sexual influence of both surgeries in our research, a significantly higher rate of sexual dysfunction and adverse effects of surgery was observed in the hysterectomy group by approximately 50% of cases compared to the adnexectomy group which only had an incidence of 5,3% (Group A in the form of dyspareunia only, but Group B in the form of loss of orgasm and/or dyspareunia).

Goktas, *et al*. confirmed the negative impact of hysterectomy on sexual life, similar to what our study supported[19]. But Dedden *et al*. supported that, hysterectomy has no effect on sexual function[20].

CONCLUSION

A statistical difference in complications was noted between both groups, with adverse outcomes occurring more frequently in the hysterectomy group than in the adnexectomy group. All of this made adnexectomy alone as effective as hysterectomy in treating postmenopausal ovarian cysts with low risk and much fewer complications.

Our study was limited by many obstacles such as: the global Corona pandemic that limited the number of patients visiting the clinic, small sample size, limited previous studies on the same topic and its aspects, most cysts that happened by chance detected during gynecological or non-gynecological radiology or examinations, and the strong misconception of some women about the uterus and ovaries after menopause, she did not consider it of any use, which is why she refuses simple procedures such as adnexectomy and asks for a hysterectomy.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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