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Clinical Outcomes and Radiological Patterns of Ovarian Cysts in Post-Hysterectomy Women a Cross-Sectional Study

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ABSTRACT

Background: Cysts in the ovaries can form even after having a hysterectomy. It is common for these cysts to show symptoms that are vague or nonspecific so obtaining a proper diagnosis can be even more difficult. The cysts can be visualized in radiological forms from simple to even showing complex and suspicious structures. Knowing how to read these images of the cysts while having a background on possible clinical outcomes is important.

Objectives: Assessing the radiological patterns, clinical presentations and differential outcomes with respect to ovarian cysts in women with a history of hysterectomy and the relationship of the patterns of the cyst with respect to the rationale of undergoing surgery versus taking a watch-and-wait approach.

Methodology: This cross-sectional study includes post-hysterectomy women who were displaying cysts in their ovaries in ultrasounds or CT scans. Claimed clinical history, indications on the type of hysterectomy performed, and all radiological detail were all documented. Cysts were all reported and classified on the basis of morphology into simple, complex, and suspicious. Management results were grouped into outcomes of conservative follow-ups, complications, or worse. Surgical and other forms of intervention were also analyzed. All data were processed with the SPSS 24.0 data software with application of chi-squared and logistic regression for analysis of the data. The threshold for statistical significance in this study was set at $P < 0.05$.

Results: 120 post-hysterectomy women whose ages were 52.6 ± 8.4 years. 58% had pelvic or lower abdominal pain, while 21% were asymptomatic, and their condition was diagnosed by chance during their medical imaging. Radiologically, there were 47.5% simplistic, 35% were complex, and 17.5% were considered suspicious. simplistic cysts were the average thin-walled and unilocular and complex and suspicious, the lesions would often contain more paired walls, and in addition, solid parts or greater blood flow were also present. A statistically significant association was observed between cyst morphology and symptom severity ($p = 0.002$), complex and suspicious cysts more likely leading to more pain or pressure symptoms. The size of the cyst also affected how it was managed; those greater than 5cm in diameter were much more ($p = 0.003$) likely to be surgically removed than those equal to or less than 5cm in diameter. Overall, 38 (31.7%) of these patients had surgery, most of these patients had suspicious features in their medical imaging, or had symptoms that would do little to disappear, and were also suspicious in nature.

Conclusion: Cysts that occur in the ovaries are not an uncommon finding in women who have previously undergone a hysterectomy. These cysts present with various patterns on any diagnostic imaging conducted. Certain characteristics of the cysts, such as being more complex in configuration and/or increasing in size, are more likely to require surgical intervention. The majority of the lesions, however, are likely to be benign, which supports the notion of more conservative approaches to the monitoring of these cysts, particularly when the imaging shows fewer concerning features. The significance of more in-depth imaging should not be understated in these patients, particularly as it can lower overall morbidity..

keywords: Ovarian cysts; Hysterectomy; Radiology; Outcomes.

Introduction

The clinical implications of keeping the ovaries intact during hysterectomy for ovarian cystic disease are important. This is due to the various clinical presentations of cysts that may appear in the form of abdominal/pelvic pain, pressure, fullness, or urinary discomfort, as well as being discovered incidentally by imaging. Although the

uterus is removed, there is still the possibility of developing adnexal pathologies due to the residual inactive ovaries, para-ovarian tissues, or peritoneal inclusions, thus making their assessment and management pertinent to a holistic approach to gynecologic practice [1,2]. The literature describes the ovarian cysts as benign and functional in nature, but also raises the possibility that there can be malignancy, making it a complex case. The ovarian cysts that are benign or functional are more common than malignant ovarian cysts. The value of imaging, especially in the form of Transvaginal u/s, is essential in delineating the nature of the cyst. CT or MRI is then placed to rule in or out malignancy if the ultrasound findings are inconclusive [3]. Imaging results need to be reviewed alongside clinical assessment, such as, to inform potential surgical decisions and/or avoid unnecessary surgery [4]. Clearly, a major obstacle to the care of ovarian cysts in post-hysterectomy women is the challenge of determining whether the cysts are benign or malignant. Most cysts are likely to be benign, however, there are cysts that, although benign, possess a complex morphology, are large, and/or contain solid components [5,6]. These cases require increased vigilance, and could warrant surgery. Further, the presence of post-surgical adhesions and changes to the pelvic anatomy due to the surgery can complicate the interpretation of scans, making the need for a diagnosis even more urgent [7]. The clinical course of these cysts is unpredictable. They may resolve without any treatment, or, in cases that may show a potential risk with the cysts based on the size, the rate of growth, and/or the symptoms, the presence of cysts may sustain symptoms or show continued growth, the cysts may warrant surgical removal [8,9]. Definitive diagnosis is determined via histopathology, and this diagnosis is the basis for subsequent decisions regarding additional treatment. Clearly, the ability to efficiently correlate certain patterns on the cysts and their clinical course is of paramount importance in determining the cysts on how to best proceed in a timely and effective manner, and for purposes of counseling the patients. This is pivotal in defining the optimal strategies for follow-up, to determine the need for active intervention, and for guiding the counseling of patients [10]. In low-resource areas, such as this one, timely and precise diagnosis is the only means of preventing the adverse consequences of complex adnexal lesions. Potentially malignant lesions may also go undiagnosed for prolonged periods of time. Unreasonable delays in the diagnosis and treatment of malignant adnexal lesions can have adverse consequences, such as the risk of missed opportunities for survival. Unreasonable delays in the diagnosis and treatment of malignant adnexal lesions can have adverse consequences, such as the risk of missed opportunities for survival. Extended operative interventions can also increase the risk of morbidity, along with the overall cost of the procedure and increased risk of complications.

Study Objectives

Evaluating the clinical characteristics, outcomes, and radiological patterns of ovarian cysts in women post hysterectomy for the purpose of establishing the predictors for surgical intervention and predicted histopathological findings.

Materials And Methods

Study Design & Setting:

Department of Obstetrics & gynecology Ayub Medical College, MTI, Abbottabad from jan 2022 to jan 2024

Participants

Records of women aged 35-70 and with a history of total, subtotal, or vaginal hysterectomy and with detectable ovarian cysts on imaging were included. Records of women that had a history of ovarian cancer, bilateral oophorectomy, were unable to provide complete medical records, or had non-visualized adnexa on imaging were removed. Clinical demographics and symptoms were collected alongside type of hysterectomy and imaging details.

Sample Size Calculation

Because complex cysts are observed among 20% of women post hysterectomy, and given the desired margin of error, required sample size calculations with 95% confidence intervals determined that 110 subjects were necessary. Due to expected missing data and desire to have a larger sample to draw more statistically significant results from, this study inclusion was 120.

Inclusion Criteria

We are recruiting women aged 35–70 years who are prior hysterectomy (all types) within the last five years to the study. Those who have an ovarian cyst detected on illustration scans (ultrasound, CT, MRI) and who are willing to give informed consent to participate in the study.

Exclusion Criteria

Previously diagnosed tumors of the ovaries Not Visualized adnexa having a past medical history of bilateral oophorectomy Clinical Records and Imaging Records are Incomplete

Diagnostic and Management Strategy

Every patient has had consistent transvaginal or transabdominal ultrasounds. For complicated or suspicious cysts, CTs or MRIs were recommended. Management decisions (surgery or follow-up) were made according to institutional gynecologic oncology guidelines based on cysts size, morphology, presence of any symptomatic solid components, and patient symptoms.

Statistical Analysis

Descriptive statistics as they pertain to the mean and standard deviation with the respect of continuous variables and percentages for categorical variables were computed using SPSS version 24 for the purposes of this analysis. Positive associations of outcome measures and radiological patterns were ascertained using Chi-Square analysis. The predictors of the surgical intervention were assessed using Binary Logistic Regression. The significance level that was determined for the purposes of this analysis was $p < 0.05$.

Ethical Approval

Ethical approval from the IRB has been received. Every participant has signed the decree of Written Informed consent. All participant data has been kept confidential while the study conformed to the Declaration of Helsinki, as well as the institutional policies and ethical guidelines.

Results

120 women who underwent hysterectomy, with an average age of 52.6 years (standard deviation of 8.4 years). The most prevalent symptom was pelvic pain (58%), while some patients presented with abdominal distension (22%) and urinary symptoms (14%), and 21% were asymptomatic and diagnosed by imaging studies. Ultrasound and CT imaging studies were associated with simple cysts, 47.5% of patients; complex cysts, 35%; and questionable atypical cysts with septations, solid components, or abnormal Doppler flow, 17.5%. The study noted an important link of symptom severity and cysts with complex morphology (p value, 0.002). The presence of larger cysts (more than 5 centimeters) was associated with pressure symptoms and further surgical management (p value, 0.003). For patients who were symptomatic and radiating simple cysts alarming features were stable clinically; uncomplicated management was proposed. 38 women (31.7%) of patients presented with symptoms of cysts who were troublesome and underwent surgical management. Malignancies in cysts were 12%. During the follow-up period of conservative management, complications and recurrences were not observed, (68.3%). Histopathology obtained and reported was benign in 88% (serous cystadenomas, cysts of small bleeding, endometriosis).

Intervention Outcome

Of all individuals enrolled, 38 (31.7%) had surgery, mainly due to complex or suspicious cysts. Histopathological examinations of these cases showed 88% of cysts to be benign, while 12% had malignancies. 68.3% of simple cysts were managed conservatively, with no significant recurrence during follow-up.

Table 1: Demographic and Clinical Characteristics of Post-Hysterectomy Women with Ovarian Cysts

Variable	**n = 120**	**Percentage (%)**
Mean age (years)	52.6 ± 8.4	—
Presenting Symptoms		
Pelvic pain	70	58.3
Abdominal distension	26	21.7
Urinary symptoms	17	14.2
Asymptomatic	25	20.8
Type of Hysterectomy		
Total abdominal hysterectomy	82	68.3
Vaginal hysterectomy	23	19.2
Subtotal hysterectomy	15	12.5
Time since hysterectomy (<5 years)	64	53.3
Time since hysterectomy (>5 years)	56	46.7

Table 1 summarizes the baseline demographic characteristics, presenting symptoms, and prior hysterectomy details of women included in the study.

Table 2: Radiological Features of Ovarian Cysts Among Study Participants

Radiological Feature	n = 120	Percentage (%)
Cyst Morphology		
Simple cyst	57	47.5
Complex cyst	42	35.0
Suspicious cyst	21	17.5
Cyst Size		
≤5 cm	74	61.7
>5 cm	46	38.3
Cyst Laterality		
Right ovary	54	45.0
Left ovary	48	40.0
Bilateral	18	15.0

Table 2 details the radiological patterns of ovarian cysts, including morphology, size distribution, and laterality based on ultrasound and CT findings.

Table 3: Association Between Cyst Characteristics and Surgical Intervention

Variable	Surgery (n=38)	Conservative (n=82)	p-value
Cyst Morphology			
Simple cyst	6	51	0.001
Complex cyst	19	23	
Suspicious cyst	13	8	
Cyst Size			
≤5 cm	9	65	0.003
>5 cm	29	17	
Symptomatic Presentation			
Symptomatic	32	51	0.020
Asymptomatic	6	31	

Table 3 shows the statistical association between cyst morphology, size, symptom status, and the likelihood of requiring surgical intervention.

Table 4: Histopathological Outcomes in Patients Undergoing Surgery

Histopathology Result	n = 38	Percentage (%)
Benign Lesions	33	86.8
Serous cystadenoma	14	36.8
Hemorrhagic cyst	10	26.3
Endometriotic cyst	9	23.7
Malignant Lesions	5	13.2
Epithelial ovarian carcinoma	4	10.5
Borderline tumor	1	2.6

Table 4 presents the final histopathological diagnoses of surgically managed ovarian cysts, indicating the

predominance of benign lesions

Discussion

This cross-sectional study focused on analyzing the radiological and clinical characteristics of post-hysterectomy ovarian lesions and found that while almost half of the lesions were radiologically simple cysts, there were still notable portions of the remaining lesions being potentially complex or radiologically concerning. The co-occurrence of most cases being in the mean age category of 52.6 ± 8.4 years and presenting primarily with pelvic pain correlates with the demographics of previously published studies dealing with adnexal pathology in peri- and postmenopausal women with a history of hysterectomy [11,12]. The data suggest that having a hysterectomy and conserving the ovaries introduces a new set of adnexal disease risk and the data still require consistent clinical monitoring [13]. The following distributions of cyst morphology in our population of study: simple - 47.5%, complex- 35%, suspicious - 17.5% match the distributions of cyst morphology in newer studies, which also described that post-hysterectomy pelvic ultra-sound patients were found to have complex or unclear adnexal mass/lesions at a rate of 25-40% [14]. As have the above studies, this study also found that complex or suspicious lesions of cysts were found to be symptomatic and resulted in surgical procedure in a higher percent of patients [15]. The documented strong association between the morphology of the cysts and the degree of symptoms ($p = 0.002$) also supports the thesis that complex cysts have some level of involvement with some substantial pathology, primarily with focus on disease constitution [16]. The cross-sectional study reported on analyzing radiological and clinical characteristics of post hysterectomy ovarian lesions and found that while almost half of the lesions were radiologically simple cysts, there were still notable portions of the remaining lesions being potentially complex or radiologically concerning [17]. The co-occurrence of most cases being in the mean age category of 52.6 8.4 years and presenting primarily with pelvic pain correlates with the demographics of previously published studies dealing with adnexal pathology in peri- and postmenopausal women with a history of hysterectomy [18]. The data suggest that having a hysterectomy and conserving the ovaries does increase adnexal disease risk and the data still require consistent clinical monitoring [19,20]. The following distributions of cyst morphology in our population of study: simple - 47.5%, complex- 35%, suspicious - 17.5% match the distributions of cyst morphology in newer studies described that post-hysterectomy pelvic ultra-sound patients were found to have complex or unclear adnexal mass/lesions at a rate of 25-40% [21,22]. As have the above studies, this study also found that complex or suspicious lesions of cysts were found to be symptomatic and resulted in surgical procedure in a higher percent of patients [23]. The documented strong association between the morphology of the cysts and the degree of symptoms ($p = 0.002$) also supports the thesis that complex cysts have some level of involvement with some substantial pathology, primarily with focus on disease constitution [24]. The cross-sectional study reported on analyzing radiological and clinical characteristics of post hysterectomy ovarian lesions and found that while almost half of the lesions were radiologically simple cysts, there were still notable portions of the remaining lesions being potentially complex or radiologically concerning [25]. The co-occurrence of most cases being in the mean age category of 52.6 8.4 years and presenting primarily with pelvic pain correlates with the demographics of previously published studies dealing with adnexal pathology in peri- and postmenopausal women with a history of hysterectomy [26]. The data suggest that having a hysterectomy and conserving the ovaries does increase adnexal disease risk and the data still require consistent clinical monitoring. The following distributions of cyst morphology in our population of study: simple - 47.5%, complex- 35%, suspicious - 17.5% match the distributions of cyst morphology in newer studies that described post-hysterectomy pelvic ultra-sound patients were found to have complex or unclear adnexal mass/lesions at a rate of 25-40% [27]. As have the above studies, this study also found that complex or suspicious lesions of cysts were found to be symptomatic and resulted in surgical procedure in a higher percent of patients [28]. The documented strong association between the morphology of the cysts and the degree of symptoms ($p = 0.002$) also supports the thesis that complex cysts have some level of involvement with some substantial pathology, primarily with focus on disease constitution.

Limitations

This study's small sample size and single-center design may limit the generalizability of our findings. There was also a lack of advanced imaging and uniform assessment of the tumor markers. Lastly, the relatively short duration of the study's follow-up limited the evaluation of the presence of recurrence or progression. Further multicenter studies are necessary to confirm the findings of the study.

Conclusion

Post-menopausal patients who have had an ovarian hysterectomy exhibit varying patterns of ovarian cysts on imaging studies. Larger lesions with greater complexity tend to be more predictive of malignant cysts and of the need for surgical intervention. Given the mostly benign nature of these lesions, a managing approach of selective conservative intervention is warranted. A more methodical and systematic approach to imaging evaluation, and decision making based on the signs and symptoms of the patients, will likely improve outcomes and the accuracy

of confirming a diagnosis. Therefore, the importance of organized imaging evaluation and follow-up with these patients cannot be overemphasized.

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Conflict of Interest: Nil

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Authors Contributions

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Drafting: **, Bushra Khan[2]**

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Final Approval of version: **All Mentioned Authors Approved the Final Version**

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