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MICROSCOPIC ANALYSIS AND CLINICAL SYMPTOM CORRELATION IN OVARIAN AND UTERINE CONDITIONS: A RETROSPECTIVE INVESTIGATION.

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ABSTRACT

BACKGROUND: Women frequently suffer from ovarian and uterine conditions that impact their health, such as fibroids, endometriosis, and ovarian cysts. Fibroids are present in around 66.5% of women having a hysterectomy, but non-neoplastic lesions are more prevalent. **OBJECTIVE:** To investigate the relationship between clinical symptoms and microscopic analysis in patients with uterine and ovarian abnormalities. **METHODS**: The retrospective cross-sectional study was conducted between September 2023 and September 2024 at Hayatabad Medical Complex, Peshawar. A total of 118 patients, who had fibroids and abnormal bleeding were included in the study. Microscopically, the thickness, width, and length of the uterus and ovaries were measured. Correlation analysis was performed using SPSS version 22, $p<0.05$ was considered statistically significant. **RESULTS**: Among the 118 individuals, symptoms such as irregular menstruation, pelvic pain, and abnormal bleeding were prevalent. Significant correlations have been found between the left ovary's dimensions; there was a high connection $p=0.01$ between its thickness, width, and length. Similarly, there were associations between clinical symptoms and uterine dimensions, including length mean=10.962cm, SD±9.5, $p=0.01$, width $p<0.01$, and thickness $p=0.01$. The presence of fibroids, with an average length of 1.386cm, was also strongly correlated with symptoms $p=0.01$. **CONCLUSION**: The strong correlation between ovarian and uterine dimensions and associated symptoms indicates their potential as valuable diagnostic indicators for reproductive health. Incorporating dimensional data into clinical assessments could lead to more personalized treatment approaches and improved symptom management.

KEYWORDS: Uterus, Histopathology, Gynecological, Ovaries, Menorrhagia.

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INTRODUCTION

Ovarian and uterine disorders, such as fibroids, endometriosis, and ovarian cysts, are common in women, especially those of reproductive age, and can have a serious impact on their health.[1] About 66.5% of women having a hysterectomy in response to menorrhagia have uterine fibroids, also known as leiomyomas, which are prevalent benign tumors that frequently cause symptoms including pelvic discomfort and heavy monthly flow.[2] Approximately 25% of women with cancer diagnoses each year have ovarian cancer. The typical 5-year survival rate ranges from 30% to 50%. In the United States, ovarian cancer will claim the lives of about 15,000 women annually.

illnesses and guide treatment plans, clinical symptoms frequently lead to further research through imaging and histological evaluation.[7]

Microscopy plays a critical role in the diagnosis of pathological alterations in the uterus and ovaries because it enables the precise identification of a number of disorders by closely examining fibroid tissue, inflammatory indicators, and cellular abnormalities.[8] For example, recognizing particular smooth muscle tumor phenotypes and distinguishing clear cell carcinoma from other tumor types are two examples of how electron microscopy has been useful in exposing the ultrastructural features of neoplasms.[9]

Current literature often addresses clinical symptoms and microscopic findings separately, creating a research gap that hinders a comprehensive understanding of their relationship. To enhance diagnostic accuracy and improve patient care, studies that link specific clinical symptoms such as pelvic pain and abnormal bleeding, with microscopic findings are essential.[10,11] This relationship is especially relevant in regional hospital settings, where past research on gynecological conditions has frequently noted inconsistencies between clinical presentations and histopathological diagnoses.[11,12] The aim of this study was to assess whether particular symptoms, like pain and abnormal bleeding, can predict certain microscopic changes in uterine and ovarian disorders by examining the correlation between these symptoms and their corresponding microscopic findings. This approach, especially in cases like ovarian neoplasms and abnormal uterine bleeding, could serve as a valuable diagnostic tool for clinicians, ultimately leading to improved patient outcomes.

MATERIALS AND METHODS

This retrospective observational study was carried out from September 2023 to September 2024 at Hayatabad Medical Complex, Peshawar. About 118 female patients were enrolled in the research who had a variety of clinical symptoms that pointed to ovarian and uterine abnormalities.[13] Female patients between the age of 13 to 70 years who had undergone transabdominal or transvaginal ultrasound followed by histopathological examination of uterine and ovarian tissues and who had clinical symptoms such as pelvic pain, abnormal uterine bleeding, irregular menstruation, and reproductive problems were eligible to participate in the study. Patients with uterine cancer diagnoses, a history of gynecological procedures that may have affected the present diagnosis or insufficient medical records were excluded from the study. Ethical approval was obtained from Institutional Review Board IRB of Hayatabad Medical Complex, Peshawar

Medical records were used to gather information, including thorough

demographic data and clinical histories. Ovarian and uterine tissues specimens were paraffin-embedded, fixed in 10% neutral-buffered formalin, and then cut to thin sections of 4—5µm for histological staining. Hematoxylin and eosin H&E staining was frequently employed, but to improve diagnostic sensitivity and specificity, special stains such Periodic Acid-Schiff PAS for glycogen, Masson's trichrome for connective tissue, and Giemsa for inflammatory cells were used as needed. Pathological characteristics such as squamous metaplasia, Nabothian cysts, and different types of cervicitis were identified by microscopic analysis. Standard histological criteria were used to classify observations, and clinical symptoms such as discomfort or irregular menstruation were organized by type in order to examine correlations between microscopic findings and clinical presentations.

Statistical analysis was performed using IBM SPSS version 22. Descriptive statistics were employed to compile patient demographics, symptoms, and histopathological findings. Chi-square tests were used to assess correlations between categorical variables, such as the presence of specific symptoms and histological abnormalities. Logistic regression identified independent predictors of microscopic outcomes based on symptom presentation, with a p-value of less than 0.05 considered statistically significant.

RESULTS

According to our study clinical symptoms of 118 individuals, 17.8% of the patients reported having an enlarged bulky uterus 17.8%, n=21 and heavy menstrual bleeding 17.8%, n=21 as their most common symptoms. The second common clinical symptom was dysfunctional uterine bleeding, observed in about 16.1% n=19 of cases. The post-menopausal bleeding 15.3%, n=18 was also observed. Further highlighting the significance of fibroid-related symptoms in this group, 14.4% of patients experienced menorrhagia and lower abdominal discomfort. In 16.1% of instances, dysfunctional uterine hemorrhage was noted, irregular uterine bleeding about 4.2% was the least common symptom.

Microscopic examination of 118 cases showed that 31.4% of the samples exhibited no signs of malignancy, while 67.8% had no significant abnormalities. The presence of normal ovaries in only 0.8% of patients, as shown in Table 1.

Table 1: Frequency of Clinical Symptoms and Microscopic diagnosis

Variable	Findings	Percentage n
Clinical Symptoms	Abnormal uterine bleeding	4.2% 5
	Dysfunctional uterine bleeding	16.1% 19
	Enlarged bulky uterus	17.8% 21
	Heavy menstrual bleeding	17.8% 21
	Menorrhagia	14.4% 17
	Pain in lower abdomen with fibroid	14.4% 17
	Post-menopausal bleeding	15.3% 18
Microscopic Findings	No Pathology seen	67.8% 80
	No evidence of malignancy is seen	31.4% 37
	Unremarkable ovaries	0.8% 1

Significant correlations between microscopic results and clinical symptoms in individuals with uterine and ovarian disorders are found in this study p=0.032. Most often, menorrhagia 22.2%, n=2 and an enlarged, bulky uterus 44.4%, n=4 was associated with cervical squamous metaplasia, indicating a possible relationship to long-term structural alterations. In cases of postmenopausal

hemorrhage 30.0%, n=3 and lower abdominal discomfort associated with fibroids 20.0%, n=2, squamous metaplasia with Nabothian cysts was prevalent.

While chronic cervicitis with erosion was mostly associated with post-menopausal bleeding 60.0%, n=3, chronic cervicitis with squamous metaplasia was more common in individuals with menorrhagia 42.9%, n=3 and dysfunctional uterine hemorrhage 28.6%, n=2. These results imply that, particularly in postmenopausal individuals, symptomatic bleeding is associated with inflammation and tissue deterioration.

Abnormal uterine bleeding 16.7%, n=2 and excessive monthly bleeding 25.0%, n=3 was among the bleeding symptoms that were often linked to Nabothian cysts alone, suggesting that they may serve as a general indicator for bleeding problems. Chronic cervicitis may be a microscopic indicator of severe bleeding symptoms, since it was most commonly observed in situations of excessive monthly bleeding 34.5%, n=10 and an enlarged, bulky uterus 24.1%, n=7 as shown in Table 2.

Table 2: Clinical Symptoms and Microscopic Findings Correlation with Ovarian and Uterine Conditions

Microscopy Findings	**Clinical Symptoms**	**Frequency %**	**Expected Count**
Cervical Squamous Metaplasia	Abnormal uterine bleeding	0 0.0%	0.4
	Dysfunctional uterine bleeding	1 11.1%	1.4
	Enlarged bulky uterus	4 44.4%	1.6
	Heavy menstrual bleeding	0 0.0%	1.6
	Menorrhagia	2 22.2%	1.3
	Pain in lower abdomen with fibroid	1 11.1%	1.3
	Post-menopausal bleeding	1 11.1%	1.4
Cervical Squamous with Nabothian Cysts	Abnormal uterine bleeding	2 20.0%	0.4
	Dysfunctional uterine bleeding	0 0.0%	1.6
	Enlarged bulky uterus	2 20.0%	1.8
	Heavy menstrual bleeding	0 0.0%	1.8
	Menorrhagia	1 10.0%	1.4
	Pain in lower abdomen with fibroid	2 20.0%	1.4
	Post-menopausal bleeding	3 30.0%	1.5
Chronic Cervicitis with Squamous Metaplasia	Abnormal uterine bleeding	0 0.0%	0.3
	Dysfunctional uterine bleeding	2 28.6%	1.1
	Enlarged bulky uterus	0 0.0%	1.2
	Heavy menstrual bleeding	0 0.0%	1.2
	Menorrhagia	3 42.9%	1.0
	Pain in lower abdomen with fibroid	2 28.6%	1.0
	Post-menopausal bleeding	0 0.0%	1.1
Chronic Cervicitis with Erosion	Abnormal uterine bleeding	0 0.0%	0.2
	Dysfunctional uterine bleeding	0 0.0%	0.8
	Enlarged bulky uterus	0 0.0%	0.9
	Heavy menstrual bleeding	0 0.0%	0.9
	Menorrhagia	2 40.0%	0.7
	Pain in lower abdomen with fibroid	0 0.0%	0.7
	Post-menopausal bleeding	3 60.0%	0.8
Chronic Cervicitis with Nabothian Cysts	Abnormal uterine bleeding	0 0.0%	0.2
	Dysfunctional uterine bleeding	1 25.0%	0.6
	Enlarged bulky uterus	2 50.0%	0.7
	Heavy menstrual bleeding	1 25.0%	0.7
	Menorrhagia	0 0.0%	0.6

	Pain in lower abdomen with fibroid	0 0.0%	0.6
	Post-menopausal bleeding	0 0.0%	0.6
Nabothian Cysts	Abnormal uterine bleeding	2 16.7%	0.5
	Dysfunctional uterine bleeding	1 8.3%	1.9
	Enlarged bulky uterus	2 16.7%	2.1
	Heavy menstrual bleeding	3 25.0%	2.1
	Menorrhagia	2 16.7%	1.7
	Pain in lower abdomen with fibroid	0 0.0%	1.7
	Post-menopausal bleeding	2 16.7%	1.8
Unremarkable Cervix	Abnormal uterine bleeding	1 2.9%	1.5
	Dysfunctional uterine bleeding	9 25.7%	5.6
	Enlarged bulky uterus	2 5.7%	6.2
	Heavy menstrual bleeding	6 17.1%	6.2
	Menorrhagia	5 14.3%	5.0
	Pain in lower abdomen with fibroid	6 17.1%	5.0
	Post-menopausal bleeding	6 17.1%	5.3
Chronic Cervicitis	Abnormal uterine bleeding	0 0.0%	1.2
	Dysfunctional uterine bleeding	4 13.8%	4.7
	Enlarged bulky uterus	7 24.1%	5.2
	Heavy menstrual bleeding	10 34.5%	5.2
	Menorrhagia	2 6.9%	4.2
	Pain in lower abdomen with fibroid	4 13.8%	4.2
	Post-menopausal bleeding	2 6.9%	4.4
Overall p-value for Chi-Square	0.032		

There were notable connections between several parameters when the ovarian, uterine, and fibroid diameters were examined under a microscope. The mean thickness of the left ovary was 1.089 cm SD±0.8 and its mean length was 2.458 cm SD±1.7. These measurements were substantially associated p = 0.01 with other ovarian and uterine parameters. A significant connection p=0.01 was also seen in the left ovary width, which measured 1.606 cm SD±1.1. The average length and thickness of the right ovary were 2.271 cm SD±1.7 and 1.106 cm SD±0.9, respectively. The breadth showed similar dimensions, with a measurement of 1.623 cm SD±1.5, although no significant relationships were found. The mean length of the uterus was 10.962 cm SD±9.5, and there was a strong association p=0.014 with other measures, indicating significant variability. The thickness, 4.907 cm SD±1.89, and width, 7.136 cm SD±2.2, both exhibited a very significant association p=0.00 and were significant p=0.01. Fibroid measurements showed that the width was 0.987 cm SD±1.0, with no significant p-value recorded, and the mean length was 1.386 cm SD±2.8, which was substantially associated p=0.01. The fibroid was just 0.03 cm thick SD±0.2 as shown in Table 3.

Table 3: Descriptive statistics of ovarian specimens

Microscopic Analysis	Mean±SD cm	P-value
Left Ovary Length	2.458 ± 1.7	0.01
Right Ovary Length	2.271 ± 1.7	
Left Ovary Thickness	1.089 ± 0.8	0.01
Right Ovary Thickness	1.106 ± 0.9	
Left Ovary Width	1.606 ± 1.1	0.01
Right Ovary Width	1.623 ± 1.5	
Uterus Length	10.962 ± 9.5	0.014

Uterus Width	7.136 ± 2.2	0.00
Uterus Thickness	4.907 ± 1.89	0.01
Fibroid Length	1.386 ± 2.8	0.01
Fibroid Width	0.987 ± 1.0	
Fibroid Thickness	0.03 ± 0.2	

The examination of correlations between the length, width, and thickness of the ovaries showed that the left and right ovaries had extremely significant associations with one another. Both left ovarian thickness $r = 0.892$, $p < 0.01$ and left ovary width $r = 0.920$, $p < 0.01$ showed a substantial positive connection with left ovary length. There were also substantial positive correlations between the right ovary measures $r = 0.941$, $p < 0.01$ and right ovarian thickness $r = 0.907$, $p < 0.01$, with the right ovary length showing the strongest link with these measurements. Table 4 indicates a significant connection between the lengths of the left and right ovaries $r = 0.743$, $p < 0.01$, indicating a bilateral relationship between ovarian size.

Table 4: Correlation between Ovarian Measurements Pearson Correlation

Variable	**Left Ovary Length**	**Left Ovary Width**	**Left Ovary Thickness**	**Right Ovary Length**	**Right Ovary Width**	**Right Ovary Thickness**
Left Ovary Length	1	0.920	0.892	0.743	0.646	0.574
Left Ovary Width	0.920	1	0.935	0.715	0.623	0.562
Left Ovary Thickness	0.892	0.935	1	0.628	0.538	0.494
Right Ovary Length	0.743	0.715	0.628	1	0.941	0.907
Right Ovary Width	0.646	0.623	0.538	0.941	1	0.943
Right Ovary Thickness	0.574	0.562	0.494	0.907	0.943	1

DISCUSSION

The study investigated the relationship between microscopic findings and clinical presentations in patients with ovarian and uterine disorders. In order to properly understand and treat gynecological disorders, a comprehensive dimensional analysis is required, since the data showed significant correlations between the sizes of ovaries, uteri, and fibroids. Strong relationships between fibroids' dimensions and those of ovarian and uterine structures suggest that these features may be used as markers of underlying medical disorders, which is in line with earlier research.

The average uterine length was 10.962 cm SD ± 9.5, indicating a wide range of uterine sizes and circumstances that may cause uterine hypertrophy. The increased uterine dimensions are often linked to fibroids and adenomyosis Yankun Feng et al., 2022. Our study found a significant

correlation between uterine width $p = 0.00$ and thickness $p = 0.01$, supporting the notion that fluctuations in uterine size are closely associated with the severity of symptoms such irregular bleeding and menorrhagia.[14] Furthermore, Qingxia Wu et al., study from 2024 has demonstrated

that surgical intervention is often necessary for symptomatic patients with bigger uterine diameters, supporting our findings on the effectiveness of such therapies.[15]

There was a strong correlation p = 0.01 between the size of the fibroid and the presence of symptoms, such as pelvic discomfort and excessive menstrual flow. The fibroid's average size was 1.386 cm SD±2.8. According to K. Yin et al. 2023, the size of the fibroid is directly correlated with the severity of symptoms, often necessitating procedures such uterine artery embolization or myomectomy. This result is in line with their findings. Further supporting the significance of fibroid dimensions in clinical presentations, a meta-analysis by Hao Qin et al. 2022 recommended that fibroid size be a crucial factor in patient care and treatment planning.[16,17] Katarzyna et al., reported significant correlation of fibroid size with bulky uterus which aligns with our study showing significant correlation of enlarged bulky uterus with fibroid size p=0.01. [18]

According to Malopolska et al. 2021, there is a favorable correlation between fibrioid size and ovarian dimensions, right and left ovarian weight r=0.50, p = 0.005; r = 0.49, p = 0.006, respectively. Our study's findings support the hypothesis that ovarian size may indicate either diseased or reproductive states by showing substantial correlations p = 0.01 between measures of the right and left ovaries' length, width, and thickness.[19] This is also supported by a study conducted by Qin et al., reported that fibroid size is significantly associated with clinical symptoms. [20]

Important new information on the role of ovarian and uterine dimensions as diagnostic indicators in gynecological therapy is provided by these findings. The robust correlations observed between these dimensions suggest that ovarian and uterine size data can assist doctors in making well-informed decisions regarding the progression of a disease and the necessity of treatment, especially in cases where benign conditions such as fibroids and cysts significantly impair a patient's quality of life. Future studies with larger sample sizes may further validate these findings, maybe augmenting diagnostic techniques and offering more individualized patient care through the use of imaging or hormonal considerations.

CONCLUSION

This study demonstrates that ovarian and uterine dimensions are strongly correlated with clinical symptoms, such as fibroids and heavy menstrual bleeding, highlighting the diagnostic importance of dimensional analysis in gynecological care. The significant association between abdominal and ovarian measurements suggests that these anatomical markers could help guide treatment and symptom management strategies. Our findings support the integration of precise size measurements in routine evaluations to tailor treatments more effectively. Further research, combined with hormonal and imaging data, may validate these markers to enhance personalized approaches in reproductive health care.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

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