CORRELATION OF HISTOLOGICAL SPECTRUM OF HYSTERECTOMY SPECIMENS WITH CLINICAL DIAGNOSIS. A MULTI-CENTRIC STUDY

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ABSTRACT

Background: One typical surgical procedure for gynecological disorders is hysterectomy. Improving surgical outcomes requires a correlation between histological results and preoperative clinical diagnosis. Clinical decision-making is an understanding of this association that improves informed and diagnostic accuracy.

Objective: To investigate the relationship between the histological spectrum of hysterectomy specimens and preoperative clinical diagnosis.

Methodology: From January 2020 to December 2023, three major medical centers—MTI Hayatabad Medical Complex, Kabir Medical College, and Naseer Teaching Hospital, Peshawar and Saidu Medical College and Saidu Group of Teaching Hospital Swat—collected 12,200 hysterectomy specimens for our retrospective cross-sectional investigation. Information contained the histological results, preoperative clinical diagnosis, and patient demographics. Histopathological and clinical diagnoses were correlated and at every stage of the study, patient confidentiality and conformity with ethical standards were guaranteed by institutional review board approval.

Results: There are 12,200 hysterectomy cases in the research. The patients were primarily 53 ± 6 years of age. They were operated on for a varietyof clinical manifestations, such as irregular uterine hemorrhage, pelvic pain, and masses. Histopathological results showed that adenomyosis was the most common disease. High agreement for malignancy but lower agreement for adenomyosis was revealed by concordance analysis.

Conclusion: This study shows that clinical diagnosis has an invaluable role in recognizing pathologies of the uterus but the proper diagnosis and treatment required histopathological examination. In conditions where there is high concordance such as malignancies, clinical assessment may be quite accurate, this is because there is low agreement in diseases such as adenomyosis hence, the validity of clinical diagnosis may be limited. These results underscore the significance of the combined use of clinical and histopathological approaches in helping patients achieve the best possible results.

Keywords: Adenomyosis, leiomyoma, histopathological findings, concordance, surgical variables, total abdominal hysterectomy, radical abdominal hysterectomy.

INTRODUCTION

The uterus plays a significant role in the female reproductive system as it holds the unborn throughout gestation. In general, womb anomalies can be divided into three categories: inflammatory, benign, and malignant.[1] These include inflammatory diseases of the pelvis, adenomyosis, endometriosis, leiomyomas in the uterus, and various carcinomas. The diagnosis is usually based on clinical presentation, and it is verified by histological examination of representative tissue samples.[2]

One of the most common surgical operations performed worldwide is the hysterectomy, which is essential to the treatment of many gynecological disorders. The uterus and, in certain situations, adjacent tissues like the ovaries and fallopian tubes are removed during this surgical procedure.[3] There are many reasons to have a hysterectomy, from benign diseases like endometriosis and uterine fibroids to tumors like cervical and endometrial cancers. A reliable diagnosis and the best possible care for patients depend on an understanding of the histological features of the excised specimens, which are conducted in millions of hysterectomies annually throughout the world.[4]

Even with conservative and medical alternatives, hysterectomy remains the second most common obstetric surgical procedure,

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surpassed only by cesarean section in many areas. This operation treats both cancerous and non-cancerous uterine diseases. It can be performed using laparoscopic, vaginal, or abdominal methods and may involve a unilateral or bilateral salpingo- oophorectomy.[5] Gynecological complaints such as fibroids, heavy menstrual flow, chronic pelvic pain, pelvic inflammatory diseases, uterine descent, and cancers of the reproductive organs are common medical reasons for hysterectomy.[6]

A key component of the treatment for uterine pathologies is surgery. Gynecologic oncologists have historically used abdominal radical hysterectomy (ARH) as the primary surgical treatment for uterine cancer.[7, 8] Compared to traditional laparotomy, minimally invasive surgery has become a feasible choice for treating early-stage uterine cancer because it offers fewer intraoperative problems, a quicker recovery, and more precise nerve-sparing procedures.[9]

The surgical care of early-stage uterine tumors underwent a major change with the introduction of the Laparoscopic approach. Patients with uterine tumors of different histologic subtypes were randomly assigned to undergo either open surgery or minimally invasive surgery.[10] Furthermore, a lower overall survival rate has been related to minimally invasive surgery.[11]

The medical importance of hysterectomy specimens' histological evaluation is enormous. It is an indispensable instrument for verifying or improving preoperative clinical diagnosis, which directs suitable treatment plans and prognostications.[12, 13] Pathologists can extract important information about the existence of benign or malignant tumors, inflammatory processes, hormonal influences, and structural anomalies by examining the cellular and tissue composition of the removed uterus. In addition to assisting in identifying the underlying pathology that requires a hysterectomy, this histopathological evaluation helps physicians customize postoperative care programs that include adjuvant therapy and surveillance procedures.[14]

It becomes crucial to comprehend how histological results in hysterectomy specimens interact with surgical outcomes. Histological analysis reveals the underlying pathology that necessitates surgery, while surgical outcomes offer vital insights into the short- and long-term prognosis.

Understanding the relationship between the histological spectrum of hysterectomy specimens with clinical diagnosis is crucial for holistic patient care. To clarify how histopathological results, correspond with preoperative clinical diagnoses and postoperative outcomes in various healthcare settings, this multi-centric study intends to investigate this association. Through establishing a link between the clinical and histological domains, we hope to improve patient care by improving treatment plans, diagnostic precision, and patient outcomes.

MATERIALS AND METHODS

Our study utilized a retrospective cross-sectional design; data was collected from records over a specified period of four years from January 2020 to December 2023. This approach allowed us to analyze information from a large sample of patients across multiple centers simultaneously. The study was conducted from the reported cases ***at three major medical centers: MTI Hayatabad Medical Complex (HMC), Naseer Teaching Hospital (NTH)Peshawar, and Saidu Group of Teaching Hospital Swat(SGTH).

As a retrospective study, data was extracted from existing medical records and pathology reports. The sample size was calculated using OpenEpi software, resulting in the inclusion of 12,200 hysterectomy specimens. The sample size was calculated using the OpenEpi software (Version 3.01), which is widely used for epidemiological studies. The calculation was based on the estimated population including patients who underwent hysterectomy at the three centers (HMC, NTH, and SGTH) over the four-year study period, a 95% confidence level was used to ensure that the results would reflect the true population values within a 5% margin of error and the acceptable margin of error was set at 5%. Based on the hospital records, an estimated proportion of specific histopathological outcomes (e.g., benign vs. malignant lesions) was factored into the calculation. The sampling technique was consecutive sampling, where all eligible records from the pathology departments of the three centers during the specified study period were included.

The inclusion criteria include data from those who underwent hysterectomy and whose specimens were sent to the pathology departments of HMC, NTH, and SGTH, those who had complete medical records, including preoperative clinical diagnoses, and histopathological reports and specimens that were adequately fixed and processed for

histopathological evaluation. The exclusion criteria include incomplete medical or histopathological data and specimens from patients with prior malignancies or those with previous uterine surgeries (e.g., myomectomy, Cystectomy, Oophorectomy) that compromised the integrity of the specimen.

Data extraction involved retrieving pertinent information from electronic medical records, including patient demographics, and preoperative clinical diagnoses. Histopathological reports of hysterectomy specimens were also reviewed to document the histological findings on a preformed questionnaire, including the presence of benign or malignant neoplasm[14].
The clinical diagnosis given for each subject was correlated with the histological results. Descriptive statistics, such as means, frequencies, and percentages were used to summarize patient characteristics, surgical outcomes, and histological findings. Correlation analyses, including the Pearson correlation coefficient were employed to explore the relationship between preoperative clinical diagnoses and histopathological diagnoses.
Given the retrospective nature of the study, informed consent from the patients was not required. However, patient confidentiality and data anonymity were strictly maintained. The study adhered to ethical standards, and data was securely stored in compliance with relevant privacy regulations. Approval from the institution's ethical committee was obtained.

RESULTS

The demographical features of the participants who had hysterectomies are shown in Table 1. The mean age of these patients is 53±6 years, representing a relatively wide age range. The total count of the participants undergoing hysterectomy was 2,200. The mean body mass index (BMI) of the participants is 27 ± 5. The distribution of BMI showed that 2,000 patients were classified as underweight (<18.5), 5000 were within the normal BMI range (18.5-24.9), 3200 were overweight (25-29.9), and 2000 were classified as obese (≥30).

The histological reasons for the hysterectomy showed most of the participants opted for hysterectomy due to adenomyosis followed by leiomyoma (fibroids), endometrial hyperplasia, endometriosis, cervical dysplasia, gynecologic malignancies, and other indications. (Table 2) Patients undergoing hysterectomies had clinical presentations. The commonest presentation observed among the participants was abnormal uterine bleeding, followed by pelvic pain, pelvic mass, postmenopausal bleeding, and urinary symptoms. (Table 3)

There were various histopathological findings observed in patients undergoing hysterectomy. Among the findings in the cervix, the most common finding was nabothian cysts followed by chronic cervicitis and metaplastic changes. Less frequently encountered pathologies included cervical polyps' leiomyoma and cervical cancer. (Table 4) In the endometrium, simple hyperplasia was the most prevalent histopathological finding followed by endometritis. Other observed pathologies included molar pregnancy, complex hyperplasia, and endometrial carcinoma. Adenomyosis was the predominant finding while leiomyoma constituted another significant finding in the myometrium. The most common pathology in the ovaries was serous cystadenoma followed by mucinous cystadenoma, benign mature teratoma, serous cystadenocarcinoma, and mucinous cystadenocarcinoma. Lastly, the fallopian tubes exhibited para tubal cysts as the primary finding.

The uterine pathologies were clinically diagnosed and then histopathologically confirmed afterward. Table 5 corresponds to a specific clinical diagnosis, detailing the total number of cases diagnosed clinically and the number of cases confirmed histopathologically, the concordance index indicating the consistency between the two, and the associated p-value indicating the statistical significance of these consistencies. Notably, while malignancy exhibited high concordance rates with significant p-values (0.04), others such as adenomyosis showed comparatively lower rates of agreement with slightly higher p-values (0.03). This analysis showed the accuracy of the clinical diagnoses in identifying uterine pathologies and highlights the importance of histopathological confirmation in ensuring accurate patient management and treatment decisions.

Table 1: Demographic Characteristics

Variable	Values

Age (years) (Mean±SD)	53 ± 6 years
Body Mass Index (BMI) (Mean±SD)	27 ± 5
Underweight (<18.5)	2000
Normal (18.5-24.9)	5000
Overweight (25-29.9)	3200
Obese (≥30)	2000

Table 2: Histopathological Reasons for Hysterectomy

Indication	n(%)
Adenomyosis	7000 (57.3%)
Leiomyoma (fibroids)	1900 (15.5%)
Endometrial hyperplasia	1200 (9.8%)
Endometriosis	900 (7.3%)
Cervical dysplasia	450 (3.63%)
Gynecologic malignancies	250 (2.04%)
Other	500 (4.09%)

Table 3: Chief Clinical Presentation

Clinical Presentation	n(%)
Abnormal uterine bleeding	5800 (47.4%)
Pelvic pain	2900 (23.7%)
Pelvic mass	1100 (9.0%)
Postmenopausal bleeding	900 (7.3%)
Urinary symptoms	1500 (4.8%)

Table 4: Variety of Histopathological Findings

Tissue	Histopathological Finding	n(%)
Cervix	Chronic Cervicitis	400 (3.27%)
	Nabothian Cyst	545 (4.4%)
	Metaplastic Changes	300 (2.4%)
	Cervical Polyp	50 (0.4%)
	Leiomyoma	80 (0.65%)
	Cervical Cancer	100 (0.8%)
Endometrium	Endometritis	400 (3.27%)
	Simple Hyperplasia	1500 (12.2%)
	Complex Hyperplasia	345 (2.8%)
	Molar Pregnancy	150 (1.2%)
	Carcinoma	50 (0.4%)
Myometrium	Adenomyosis	3130 (25.6%)
	Leiomyoma	2500(20.4%)

Ovaries	Serous Cystadenoma	550 (4.5%)
	Mucinous Cystadenoma	300 (2.4%)
	Benign cystic Teratoma	145 (1.1%)
	Serous Cystadenocarcinoma	150 (1.2%)
	Mucinous Cystadenocarcinoma	55 (0.40%)
Fallopian Tubes	Cyst	1300(10.6%)

Table 5: Concordance Between Clinical and Histopathological Diagnoses of Uterine Pathologies

Clinical Diagnosis	Total Clinically Diagnosed Cases	Histopathologically Confirmed Cases	Concordance Index (%)	p-value
Malignancy	100	71	71.1%	0.04
Adenomyosis	120	35	29.1%	0.03

DISCUSSION

In the present study adenomyosis was established to be the leading cause of hysterectomy surgery among women and was followed by leiomyoma and endometrial hyperplasia and endometriosis. In clinical practice the three complaints that were mostly present include acute and chronic pelvic pain, abnormal uterine bleeding and the presence of a mass in the pelvic region In histopathological examinations of cervical smears nabothian cysts and chronic cervicitis were present most of the time while endometrial hyperplasia and endometritis were present in most samples of endometrial curetting. The most common pathological features noted in myometrium comprised of adenomyosis and leiomyoma and in the ovaries contained serous and mucinous cyst adenomas. There was moderate to high degree of agreement between the ovarian, uterine or cervical malignancies and particularly low for adenomyosis where histopathological confirmation was therefore recommended for better diagnosis and management of patients.

The current study reveals the histological distribution and prevalence of the causes of hysterectomy to be adenomyosis, leiomyoma (both isolated & together), endometrial hyperplasia, and endometriosis in that order. These results corroborate with other studies carried out in Pakistan where adenomyosis and leiomyoma were also identified as the major factors for hysterectomy, thus confirming the observed clinical trend in the area.[15, 16] Likewise, Ko JS et al., 2021 have also reported that leiomyoma is among the most common reasons for hysterectomy.[17] However, Protopapas A et al., 2020 stated that adenomyosis is less detected clinically and this also supports the lower clinical-histopathological correlation observed in the present study.[18]

The most common clinical presentation in our study was abnormal uterine bleeding (AUB), followed by pelvic pain and pelvic mass. This observation is consistent with other studies where AUB is often the primary indication for hysterectomy. As expected, the most common clinical indication for hysterectomy in the present study was AUB, and then pelvic pain, and mass. A cross-sectional study performed in the UK by Jain V et al. in 2022 revealed comparable results with AUB being the commonest symptom that required surgery.[19] Pelvic pain and mass are also common complaints, especially when it is associated with uterine leiomyoma or adenomyosis.[20]

Therefore, in the cervix, nabothian cysts, chronic cervicitis, and metaplastic changes were the most frequent findings, and simple hyperplasia and endometritis for the endometrial tissues. These results are similar to other studies that have found chronic cervicitis and hyperplastic changes in hysterectomy specimens frequently. In addition, cross-sectional studies are by these results, and chronic cervicitis is often diagnosed, especially among women with reproductive tract infections.[21] These were the findings of the pathology in the ovaries; serous cystadenoma being the most frequent and followed by mucinous cystadenoma lastly benign mature teratoma. This is in concordance with a study that indicates benign ovarian cysts

as the main ovarian abnormality in hysterectomy samples.[22]

The correlation between a clinical diagnosis and histopathological result was not always perfect, malignant pathological findings showed a good correlation while for some conditions like adenomyosis, the correlation was low. This lower concordance for adenomyosis is seen due to clinical difficulties in diagnosing this disease which frequently requires histopathological corroboration. The same problem with the clinical diagnosis of adenomyosis has also been noted in other studies where MRI has been suggested to enhance the accuracy of diagnosis.[23] In contrast, the high concordance between the preoperative clinical assessment and histopathologic diagnosis observed in malignancies in our study is largely probably because the preoperative clinical assessment of gynecological malignancies in developed countries is normally more accurate as a result of superior diagnostic equipment.[24]

The present study shows that clinical diagnosis is important in the management of uterine pathologies but histopathological confirmation is crucial to direct the appropriate management. The disparities in diagnostic precision of particular conditions such as adenomyosis demonstrate the need to advance diagnostic modalities and approaches in daily practice.

CONCLUSION

This study showed that clinical diagnosis has an invaluable role in recognizing pathologies of the uterus but the proper diagnosis and treatment required histopathological examination. In conditions where there is high concordance such as malignancies, clinical assessment may be quite accurate, this is because there is low agreement in diseases such as adenomyosis hence, the validity of clinical diagnosis may be limited. These results underscore the significance of the combined use of clinical and histopathological approaches in helping patients achieve the best possible results.

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Key for contribution of authors

A. Conception/ Study/Designing/Planning
B. Active Participation in Active Methodology
C. Interpretation/Analysis and Discussion

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REFERENCES

1. Herrington CS. The female reproductive system. Muir's Textbook of Pathology: CRC Press; 2020. p. 405-26.
2. Mikhailiuk IP, Shandanovina YA, Gadjibalaevna D, Ramazanova AAB, Dzhalaeva KS, Abdulaeva RS, et al. Uterine Fibroid in Combination with Adenomyosis. Purulent-Inflammatory Diseases of the Female Genital Organs and Their Effect on Reproductive Function. International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies. 2022;13(11):1-10. DOI: 10.14456/ITJEMAST.2022.220
3. Hanafi M. Methods for Mass Tissue Removal by Minimally Invasive Reproductive Surgery. Advances in Minimally Invasive Gynecologic Reproductive Surgery: CRC Press; 2021. p. 110-8.
4. Vitale SG, Riemma G, Alonso Pacheco L, Carugno J, Haimovich S, Tesarik J, et al. Hysteroscopic endometrial biopsy: from indications to instrumentation and techniques. A call to action. Minimally Invasive Therapy & Allied Technologies. 2021;30(5):251-62. https://doi.org/10.1080/13645706.2021.1960862
5. Madueke-Laveaux OS, Elsharoud A, Al-Hendy A. What we know about the long-term risks of hysterectomy for benign indication—a systematic review. Journal of clinical medicine. 2021;10(22):5335. https://doi.org/10.3390/jcm10225335
6. Shahid R, Abbas H, Mumtaz S, Perveen F, Bari MF, Raja T, et al. Hysterectomy and oophorectomy in reproductive age: a cross-sectional study from a tertiary care hospital. Cureus. 2020;12(5). doi: 10.7759/cureus.8344
7. Brandt B, Levin G, Leitao Jr MM. Radical hysterectomy for cervical cancer: the right surgical approach. Current Treatment Options in Oncology. 2022;23(1):1-14. https://doi.org/10.1007/s11864-021-00919-z
8. Ceccaroni M, Roviglione G, Malzoni M, Cosentino F, Spagnolo E, Clarizia R, et al. Total laparoscopic vs. conventional open abdominal nerve-sparing radical hysterectomy: clinical, surgical, oncological and functional outcomes

in 301 patients with cervical cancer. Journal of Gynecologic Oncology. 2021;32(1). doi: 10.3802/jgo.2021.32.e10
9. Yang FC, Huang W, Yang W, Liu J, Ai G, Luo N, et al. Cervical cancer surgery: Current state of affairs. Gynecology and minimally invasive therapy. 2021;10(2):75-83. *DOI:* 10.4103/GMIT.GMIT_81_20
DOI: 10.4103/GMIT.GMIT_81_20
10. Nobre SP, Mueller JJ, Gardner GJ, Roche KL, Brown CL, Soslow RA, et al. Comparison of minimally invasive versus open surgery in the treatment of endometrial carcinosarcoma. International Journal of Gynecologic Cancer. 2020;30(8). https://doi.org/10.1136/ijgc-2020-001573
11. Kim SI, Park DC, Lee SJ, Song MJ, Kim CJ, Lee HN, et al. Survival rates of patients who undergo minimally invasive surgery for endometrial cancer with cervical involvement. International Journal of Medical Sciences. 2021;18(10):2204. doi: 10.7150/ijms.55026
12. Török P, Krasznai Z, Molnár S, Lampé R, Jakab A. Preoperative assessment of endometrial cancer. Translational Cancer Research. 2020;9(12):7746. doi: 10.21037/tcr-20-2068
13. Daoud T, Sardana S, Stanietzky N, Klekers AR, Bhosale P, Morani AC. Recent imaging updates and advances in gynecologic malignancies. Cancers. 2022;14(22):5528. https://doi.org/10.3390/cancers14225528
14. Stone R, Carey E, Fader AN, Fitzgerald J, Hammons L, Nensi A, et al. Enhanced recovery and surgical optimization protocol for minimally invasive gynecologic surgery: an AAGL white paper. Journal of minimally invasive gynecology. 2021;28(2):179-203. https://doi.org/10.1016/j.jmig.2020.08.006
15. Shams R, Naz S, Nadeem S, Khan M, Noreen S, Rasheed S. Histopathological Analysis of Hysterectomy Specimen. PJMH S. 2020;14(1):344-6.
16. Haidar G, Anjum F, Khowaja S, Majid A, Rani K, Hingoro R. Indications and histopathological assessment of hysterectomy specimens. Journal of The Society of Obstetricians and Gynaecologists of Pakistan. 2020;10(3):171-4.
17. Ko JS, Suh CH, Huang H, Zhuo H, Harmanli O, Zhang Y. Association of race/ethnicity with surgical route and perioperative outcomes of hysterectomy for leiomyomas. Journal of Minimally Invasive Gynecology. 2021;28(7):1403-10. e2. https://doi.org/10.1016/j.jmig.2020.11.008
18. Protopapas A, Grimbizis G, Athanasiou S, Loutradis D. Adenomyosis: Disease, uterine aging process leading to symptoms, or both? Facts, views & vision in ObGyn. 2020;12(2):91. PMID: 32832923; PMCID: PMC7431194. https://doi.org/10.1007/s00261-021-03126-4
19. Jain V, Chodankar RR, Maybin JA, Critchley HO. Uterine bleeding: how understanding endometrial physiology underpins menstrual health. Nature reviews endocrinology. 2022;18(5):290-308. https://doi.org/10.1038/s41574-021-00629-4
20. Mathew RP, Francis S, Jayaram V, Anvarsadath S. Uterine leiomyomas revisited with review of literature. Abdominal Radiology. 2021;46(10):4908-26. https://doi.org/10.1007/s00261-021-03126-4
21. Brunham RC, Paavonen J. Reproductive system infections in women: lower genital tract syndromes. Pathogens and disease. 2020;78(5):ftaa022. https://doi.org/10.1093/femspd/ftaa022
22. Wolfman W, Thurston J, Yeung G, Glanc P. Guideline No. 404: initial investigation and management of benign ovarian masses. Journal of Obstetrics and Gynaecology Canada. 2020;42(8):1040-50. e1. https://doi.org/10.1016/j.jogc.2020.01.014
23. Tellum T, Nygaard S, Lieng M. Noninvasive diagnosis of adenomyosis: a structured review and meta-analysis of diagnostic accuracy in imaging. Journal of minimally invasive gynecology. 2020;27(2):408-18. e3. https://doi.org/10.1016/j.jmig.2019.11.001
24. Sehouli J, Heise K, Richter R, Woopen H, Anders L, Inci MG. Preoperative quality of life as prediction for severe postoperative complications in gynecological cancer surgery: results of a prospective study. Archives of Gynecology and Obstetrics. 2021;303:1057-63. https://doi.org/10.1007/s00404-020-05847-1