

Research Article

Comparative Study of Diagnostic Accuracy of Ultrasonography Vs Histopathology in Patients Undergoing Hysterectomy Due To Uterine Pathologies

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ABSTRACT

Aim: To compare the diagnostic accuracy of ultrasonography vs histopathology in patients undergoing hysterectomy due to uterine pathologies

Materials and method: a cross sectional study was conducted in the Department of Gynecology. A total of 100 women fulfilling the predefined eligibility criteria were enrolled. Married, multiparous women aged 18-45 years with clinically suspected uterine pathology on ultrasonography and subsequent histopathological confirmation were included in the study.

Results: Among 100 women undergoing hysterectomy, 84 (84.0%) were aged ≥ 40 years and 16 (16.0%) were < 40 years. Benign uterine pathology accounted for 98% of cases, with fibroid being the most common ultrasonographic finding (62.5%), followed by adenomyosis (15.0%), endometrial hyperplasia (12.5%), and endometrial polyp (10.0%). Histopathology identified leiomyoma as the predominant pathology (59%), followed by endometrial hyperplasia (15%) and adenomyosis (14%). Ultrasonography demonstrated high diagnostic accuracy for adenomyosis and endometrial polyp (98.75% each), followed by fibroids (96.25%) and endometrial hyperplasia (95.0%).

Conclusion: Histopathological findings correlated well with preoperative ultrasonography. Ultrasound showed high diagnostic accuracy and can be used as a first-line modality for detecting uterine pathologies and guiding referral for hysterectomy.

Keywords: Ultrasonography, Uterine Diseases, Hysterectomy, Uterus, Diagnostic Imaging.

INTRODUCTION

Hysterectomy is ranked as the second most common surgical procedure in department of obstetrics & gynaecology, after cesarean section. Its rate varies from 6.1 to 8.6 per 1000 women of reproductive ages.¹ Its incidence vary all over the world. It varies from place to place on the basis of clinical factors. It is estimated to be higher in developing countries than in West, the America (5.1/1000), Australia (4.7/1000), and Germany (3.6/1000).² Hysterectomy is ranked as one of the most common elective surgical procedures worldwide.³ The gynecologic tract is fourth most common site of cancer after breast, lungs and gastrointestinal cancers. The sixth most frequent form of cancer in women worldwide is the endometrial carcinoma and hysterectomy is accepted as the treatment for all malignant pelvic pathologies.⁴

However, in case of benign pelvic diseases, such as uterine fibroids, endometrial polyps, adenomyosis, abnormal uterine bleeding and uterine prolapse, it is considered when other treatment options fail. Hysterectomy is a

surgery that involves the removal of the uterus. On basis of resection technique, it can be total or subtotal. The laparoscopic hysterectomy further includes total laparoscopic, laparoscopic supra-cervical and laparoscopic-vaginal hysterectomy. Indications for hysterectomy varies from benign to malignant lesions of the female genital tract. The most common gynecological indications of hysterectomy are abnormal uterine bleeding, fibroids, pelvic prolapse, premalignant and malignant lesions of the uterus, cervix, fallopian tubes or ovaries.⁵ Abnormal uterine bleeding can be due to benign or malignant lesions of uterus. In 2011, PALM-COEIN acronym was designed by the International Federation of Gynecology and Obstetrics for the causes of abnormal uterine bleeding which includes polyps, adenomyosis, leiomyoma, hyperplasia/malignancy, coagulopathy, endometrial, ovulatory disorders, iatrogenic and not otherwise classified pathologies.⁶ The nomenclature was modified further in year 2018 and it included the sub-classification of leiomyoma on the basis of ultrasound findings.⁷ The National Institute

for Health and Care Excellence recommends hysterectomy as the second line treatment for bleeding, when pharmacological, hormonal and less invasive procedures have failed. The pelvis is divided structurally by an oblique plane from sacral promontory to the superior margin of the pubic symphysis into 2 compartments, true and the false pelvis.

The uterus is an organ responsible for functions such as menstruation, gestation, labor and delivery. Anatomically, the uterus is located in pelvis anterior to the rectum and posterior to the urinary bladder. Ultrasound is recognized as the primary imaging modality in evaluation of female pelvis. Trans-vaginal ultrasound allows visualization of the pelvic viscera in true pelvis.⁸ Ultrasound modality can differentiate benign and malignant pelvic pathologies by the subjective evaluation on gray-scale ultrasound and can often make a specific diagnosis on basis of pattern recognized on the gray-scale ultrasound image. Trans-abdominal approach is preferred to identify pelvic pathology and pregnancy whereas the trans-vaginal ultrasound is suggested as the first line imaging modality for reproductive age females with acute pelvic pain because of easy accessibility, lesser ionizing radiation and efficiency in identifying pelvic disorders. In patients of endometrial tumor, TVS has been extensively used to assess depth of myometrial invasion.^{9,10} Doppler techniques are used to evaluate vascularity.

The objectives of the study were to evaluate the diagnostic accuracy of ultrasound in uterine pathologies and to compare ultrasonographical findings with histopathological findings.

MATERIALS AND METHOD

After obtaining clearance from institutional ethical committee, a cross sectional study was conducted in the Department of Gynecology. A total of 100 women fulfilling the predefined eligibility criteria were enrolled.

Study Population

Married, multiparous women aged 18–45 years with clinically suspected uterine pathology on ultrasonography and subsequent histopathological confirmation were included in the study.

Inclusion Criteria

- Married, multiparous women aged 18–45 years.
- Clinically suspected uterine pathology detected on ultrasonography.

- Histopathological confirmation of the uterine lesion.

Exclusion Criteria

- Patients who refused hysterectomy after being advised.
- Patients who opted for medical management instead of surgical treatment.

METHODOLOGY

Ultrasonographic Evaluation

Ultrasonography was performed using a Canon APLIO 300 ultrasound system. The endometrial cavity was evaluated in sagittal and transverse planes. The uterine pathologies assessed included fibroids, adenomyosis, endometrial hyperplasia, and endometrial polyps. Fibroid is common hormone sensitive, benign gynaecological tumour that originates from the smooth muscle layer and is seen on sonography as a well - circumscribed mixed or hypoechoic mass lesion that originates from the myometrium, interrupts the endometrial stripe and have characteristic acoustic shadowing. Adenomyosis is defined as the benign invasion of the endometrium into the myometrium. Both endometrial glands and endometrial stroma must be present. Endometrial hyperplasia is a condition of excessive proliferation of the endometrial cells and appears on ultrasound as thickened endometrium. Endometrial polyps refer to outgrowths of endometrial glands and stroma within the uterine cavity. They are endometrial epithelial proliferations and appears on ultrasound as round or oval localized echogenic lesion located in the endometrial cavity, sometimes with an echogenic bright rim with intact endometrial-myometrial junction.

Histopathological Evaluation

Women with significant sonographic abnormalities underwent hysterectomy, and the surgical specimens were submitted for histopathological examination. Specimens were fixed in 10% formalin, processed and embedded in paraffin wax. Sections were prepared and stained with hematoxylin and eosin (H&E) for microscopic evaluation.

Study Outcome

The ultrasonographic findings were compared with the histopathological diagnosis, which was considered the reference standard for final diagnosis of uterine pathology.

Statistical Analysis

Sensitivity, specificity and diagnostic accuracy of ultrasound was calculated in the patients who underwent hysterectomy for uterine diseases, with histopathological findings used as the gold standard. Data were analyzed using SPSS Statistics 25.

RESULTS

In our study, Among the 100 patients included in the study, 16 (16.0%) were younger than 40 years, whereas the majority, 84 (84.0%), were aged 40 years or above. Thus, hysterectomy was more frequently performed among women aged ≥ 40 years, indicating a higher burden of uterine pathology in this age group (Table 1). Among 100 patients, 98 (98.0%) underwent hysterectomy for benign disease, while 2 (2.0%) had suspected malignant disease on ultrasonography. Fibroid was the most common ultrasonographic pathology (62.5%), followed by adenomyosis (15.0%), endometrial hyperplasia (12.5%), and endometrial polyp (10.0%) (Table 2). Histopathological diagnosis

of our study revealed leiomyoma as predominant pathology among various hysterectomy specimens. Leiomyoma is found in 59% cases followed by endometrial hyperplasia in 15% and adenomyosis in 14% of the cases.

Among 100 patients, 63 (63%) were diagnosed with fibroid on ultrasonography, while 59 (59%) had fibroid confirmed on histopathology. Of the USG-positive cases, 59 were histopathologically confirmed, whereas 4 were not (Table 3). Among 100 patients, 12 (12%) showed endometrial hyperplasia on ultrasonography, while 15 (15%) were confirmed on histopathology. Among USG-positive cases, 11 were histopathologically confirmed (Table 4).

Ultrasonography demonstrated high diagnostic accuracy for all evaluated uterine abnormalities, with the highest accuracy for adenomyosis and endometrial polyp (98.75%), followed by fibroids (96.25%) and endometrial hyperplasia (95.0%) (Table 5).

Table 1: Age Group Distribution of Patients Undergoing Hysterectomy

Age group	Frequency (n)	Percentage (%)
<40 years	16	16.0
≥ 40 years	84	84.0
Total	100	100.0

Table 2: Hysterectomy Indications Based on Ultrasonography and Uterine Pathologies Detected on Ultrasonography

Indication	Frequency (n)	Percentage (%)
Benign disease	98	98.0
Suspected malignant disease	2	2.0
Ultrasonographic Finding		
Fibroid	63	62.5
Adenomyosis	15	15.0
Endometrial hyperplasia	12	12.5
Endometrial polyp	10	10.0

Table 3: Comparison of Ultrasonography and Histopathology for Fibroid Diagnosis

Fibroid on USG	Fibroid on Histopathology: Yes	Fibroid on Histopathology: No	Total
Yes	59	4	63
No	0	37	37
Total	59	41	100

Table 4: Comparison of Endometrial Hyperplasia on USG and Histopathology

Endometrial Hyperplasia on USG	Histopathology: Yes	Histopathology: No	Total
Yes	11	1	12
No	4	84	88
Total	15	85	100

Table 5: Diagnostic Performance of Ultrasonography for Uterine Abnormalities.

Uterine Abnormality	Sensitivity (%)	Specificity (%)	Diagnostic Accuracy (%)
Fibroids	100.0	90.0	96.25

Adenomyosis	100.0	98.5	98.75
Endometrial hyperplasia	75.0	98.53	95.0
Endometrial polyp	100.0	98.6	98.75

DISCUSSION

The clinical presentation and indications for hysterectomy vary from benign uterine pathologies to malignant tumors. Hysterectomy provides definitive cure to diseases which involve uterus in cases such as fibroids, adenomyosis, endometrial hyperplasia and malignancies of genital tract.

In our study the maximum incidence of hysterectomy is found in females of 40-45 years with the maximum number of patients as 42 years of age. The mean age of patients is 41.8 years. Rashid et al reported that most of the females who underwent hysterectomy were 41 to 50 years of age, with 44.64 years as a mean age.¹¹ Neelgund SM et al reported same age range for the patients undergoing hysterectomy and mean age was found to be 45 years in their study.¹²

The most common clinical symptoms reported in our study is menorrhagia, followed by mass per abdomen. This is similar to the study of Neegland reported the main presenting complaint was menorrhagia (63.4%).¹² Mahmoud Khaniki et al reported that AUB was the main complaint in about 62.2% patients followed by abdominal pain in 13.3% and uterine prolapse in 7.4% of the patients.¹³ The study by Shergill SK reported menorrhagia as the chief presenting symptom in 66% women undergoing hysterectomy.¹⁴

Histopathological diagnosis of our study revealed leiomyoma as predominant pathology among various hysterectomy specimens. Leiomyoma is found in 59% cases followed by endometrial hyperplasia in 15% and adenomyosis in 14% of the cases. Therefore, fibroids are labelled as most frequent indication of hysterectomy. The commonest benign pathology of uterus identified on histopathological analysis is leiomyoma. Pathak V et al¹⁵ reported high incidence of leiomyomas consistent to the findings seen in our study. In contrast to the our results lower values of incidence of leiomyomas on histopathology were observed in other studies.

Adenomyosis is another observed pathology on hysterectomy specimens for AUB. Diagnosis of adenomyosis is difficult during preoperative period as uterus seems to be bulky on ultrasound but specific diagnosis of adenomyosis cannot be made solely on ultrasonography and can only be confirmed

after hysterectomy on histopathological assessment. In our study adenomyosis is prevalent among 14% of the hysterectomy specimens. Neelgund SM et al¹² and Sobande et al¹⁶ also reported similar results in case of adenomyosis. Endometrial hyperplasia was observed in 15% cases of our study. Similar results were reported by Ranabhat et al. in their study.¹⁷

In present study, Sensivity, specificity and diagnostic accuracy of ultrasound in uterine pathologies is summarised in Table 5. The study revealed that ultrasonography has sensitivity of 100% and specificity of 90% in diagnosing uterine fibroids and a diagnostic accuracy of 96.25%. The results of our study were similar to those reported by Veena and Shivalingaiah who reported an accuracy rate of 96.7%.¹⁸ A study conducted on 643 infertile women by Niknejadi et al. reported similar sensitivity (89.2%) and specificity (92.5%) as described in their study.¹⁹

In case of adenomyosis, ultrasound provides information with a specificity of 98.5% and sensitivity of 100%, whereas the diagnostic accuracy of ultrasound in diagnosis adenomyosis is 98.75%. A retrospective study carried out on 80 women with preoperative diagnosis of adenomyosis on abdominal scan by Siedler and coworkers had a sensitivity of 63% and a specificity of 97% for adenomyosis.²⁰ With respect of diagnosing endometrial hyperplasia, our study revealed the sensitivity of 75% and specificity of 98.5%, whereas the diagnostic accuracy of ultrasound in diagnosis endometrial hyperplasia is 95%. Bromley B et al demonstrated diagnostic accuracy of 47.6%, sensitivity and a specificity of 68.7% and 41.7% in diagnosing cases of endometrial thickening.²¹ Results of our study were higher than those observed in studies carried out by Veena and Shivalingaiah¹⁸ who described diagnostic accuracy of 88.33%,. Our results were consistent to the previously described reports by other authors.

Limitations

This study had a limited sample size of 100 participants and was conducted at a single centre, which may restrict the generalizability of the findings. As a cross-sectional study conducted among selected women undergoing hysterectomy, the results may not be applicable

to the broader population with uterine pathology.

CONCLUSION

Histopathological analysis correlates well with the pre-operative sonographical diagnosis. The diagnostic accuracy of ultrasound in detecting intrauterine pathology urges us to utilize ultrasonography widely to diagnose uterine pathologies. In conclusion, ultrasound is a first line approach for detection of uterine pathologies and referring patients for hysterectomy.

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