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To relate clinico-pathological findings with ultrasonographical findings in hysterectomy specimen: A retrospective study

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Abstract
Aim: To describe the distribution of various types of pathologies in the hysterectomy specimens and to relate histopathological findings with pre-operative clinical diagnosis and radiological findings.
Material and Methods: This is a retrospective observational study conducted in the Department of Obstetrics & Gynecology and Pathology, KVGMCH, Sullia from 1st August 2020 to 31st August 2021. The study population consisted of 200 patients, who underwent hysterectomy in our hospital. Clinical data was obtained regarding age, parity, presenting complaints, radiological and other pre-operative investigation findings, surgical procedure performed, and the type of specimen sent, from patient's record file.
Results: The majority of patients were in the age group of 41-50 years (54.0%), with rural background (138, 69%), and belonged to lower-middle-class socioeconomic status (149, 74.5%). Dysmenorrhea (60, 30%) was the commonest clinical presentation. The commonest clinical indication of hysterectomy was abnormal uterine bleeding (AUB) (119, 59.5%). The most common USG finding was bulky fibroid uterus (66, 33.0%). The commonest approach for hysterectomy was laparoscopic i.e., total laparoscopic hysterectomy with bilateral salpingectomy (88, 44%). On histopathological examination of hysterectomy specimen, leiomyomas (53, 26.5%), chronic cervicitis (123, 61.5%), secretory endometrium (59, 29.5%), and b/l corpus albicans (45, 22.5%) were the commonest findings. The histopathological findings of myometrium, endometrium, and ovaries showed a statistically significant relationship with both clinical diagnosis and USG findings.
Conclusion: Every hysterectomy specimen should be subjected to histopathological examination. Some pathologies can be missed clinically and ultrasonographically, so it is important to relate clinicopathological findings with ultrasonographical findings in all cases of hysterectomy, to improve the clinical outcome and post-operative management.

Keywords: hysterectomy, histopathology, AUB, leiomyoma

Introduction

Hysterectomy is the surgical removal of the uterus and is the most common major gynecological surgical procedure performed worldwide. [1] It was first performed in 1507 by Berengarius of Bolonga through the vaginal route. But the credit for the first vaginal hysterectomy was given to Langen, back in 1813. The first total abdominal hysterectomy with bilateral salpingo-oophorectomy was done by Clay in 1844. [9]

Hysterectomy is the definitive management for a wide range of benign and malignant conditions of the female reproductive tract, including fibroid, adenomyosis, dysfunctional uterine bleedings, uterine prolapse, post-partum hemorrhage, and malignant lesions of the uterus, ovaries, and cervix. [2]

The diagnostic importance of histopathological evaluation of hysterectomy is well explained in patients of female genital tract cancers where adjuvant treatment is dependent on the grade, determination of targeted therapy, and extent of invasion. Histopathological examination of hysterectomy specimens, irrespective of clinical diagnosis is essential to study the associations between multiple lesions in the female genital tract, to identify newer etiologies for the diseases, and to study the effects of hormones in various parts of the female genital tract with its potential consequences. [4] The diagnosis of adenomyosis is established only by histopathological examination, while DUB is a diagnosis of exclusion. Some of the patients may be suspected of having a malignancy on pre-operative assessment e.g., those with postmenopausal bleeding, and histopathological examination may aid in ruling out this suspicion. [9]

The indications to perform hysterectomy should always be justified and the pathology should be proved histopathologically. This is so because the hysterectomy is a major surgery that has its own physical, economic, emotional, sexual, and medical significance to the women. Histopathological analysis and review is mandatory to evaluate the appropriateness of the hysterectomy. [7]

Thus, this study was conducted to find out the distribution of various types of pathologies in the hysterectomy specimens in the population studied and to relate histopathological findings with clinical features, pre-operative clinical diagnosis, Radiological findings.

Subjects and Methods

Setting

Department of Obstetrics and Gynecology, K.V.G. Medical College Hospital, Sullia

Duration

1st August 2020 to 31st August 2021

Type of study

Retrospective study

Sampling Size calculation

Universal sampling

Inclusion criteria

1. Hysterectomy done for Benign causes
2. All hysterectomy specimens sent for histopathological examination at the time of study period

Exclusion criteria

1. Hysterectomies with no adequate clinical data
2. Obstetrical hysterectomies
3. Preoperatively diagnosed malignancies

Data collection procedure

The study population consisted of 200 patients, who underwent hysterectomy in our hospital. Clinical data were obtained regarding age, parity, presenting complaints, radiological and other pre-operative investigation findings, the surgical procedure performed, and the type of specimen sent, from the patient's record file.

Statistical analysis

The data were entered in Microsoft Excel version 2007 and IBM SPSS Version 25 and was analyzed. The data were expressed in the form of frequencies, percentages, charts, or graphs. Nominal categorical data between the groups were compared using the Chi-square test. $P<0.05$ was taken to indicate a statistically significant difference.

Results

Out of 200 patients, majority of the patients were in the age group of 41-50 years (54.0%) (Figure 1).

Most of the patients were from rural areas (138, 69%) compared to an urban area (62, 31%) (Figure 2).

All the subjects were classified according to the Modified Kuppuswamy socioeconomic status scale (2016). Most of the study participants (149, 74.5%) belonged to the lower-middle class socioeconomic status (Figure 3).

Parity that is defined as the total number of confirmed pregnancies reaching 24 weeks of gestation played an important role in the hysterectomy procedures, patient corresponding to parity of (1-3) contributed significantly that is 75% of total patients followed by multipara patients of parity (4-5).

The commonest symptom at the time of presentation was dysmenorrhea (60, 30%), followed in decreasing order by heavy menstrual bleeding (55, 27.5%), mass par vagina (42, 21%) abdominal pain (25, 12.5%), white discharge per vaginum (13, 6.5%), and mass per abdomen (5, 2.5%) (Table 1).

The commonest clinical indication of hysterectomy was abnormal uterine bleeding (AUB) (119, 59.5%) followed by uterovaginal prolapse (42, 21.0%) and pelvic inflammatory disease (PID) (28, 14.0%). Vaginal hysterectomy was mainly done for utero-vaginal prolapse (Table 2).

The most common USG finding in the population studied was bulky fibroid uterus (66, 33.0%) followed by uterine descent (42, 21.0%), PID (27, 13.5%), and adenomyosis (26, 15.5%). The fibroid uterus was also seen with various endometrial and adnexal abnormalities (Table 3).

The commonest approach for hysterectomy was laparoscopic i.e., total laparoscopic hysterectomy with bilateral salpingectomy in 88 (44%) cases, followed by vaginal hysterectomy with bilateral salpingo-oophorectomy with pelvic floor repair (38, 19%) and total abdominal hysterectomy with salpingectomy (24, 12%) (Table 4).

The majority of the pap smear findings reported in our study were negative for intraepithelial lesions or malignancy (NILM) (12, 56.0%), followed by inflammatory smear (52, 26%), and atrophic smear (33, 16.5%). One case each of ASCUS (0.5%), Low-Grade Squamous intraepithelial lesion (LSIL) (0.5%), and High-Grade Squamous intraepithelial lesion (HSIL) (0.5%) were also noted.

Out of 71 patients who underwent oophorectomy, 65 (32.5%) underwent B/L oophorectomy, and 6 (3%) U/L oophorectomy (Figure 4).

In case of myometrium, 53 (26.5%) cases of leiomyomas were noted, followed by adenomyosis with leiomyoma (51, 25.5%), adenomyosis alone (25, 12.5%), and leiomyosarcoma (1, 0.5%). 70 (35.0%) cases showed unremarkable myometrium (Table 7).

On histomorphological study of cervical lesions, chronic cervicitis was the commonest finding (123, 61.5%) (Table 8).

In case of endometrial findings, secretory endometrium was the commonest finding in 59 cases (29.5%), followed by proliferative endometrium in 37 cases (18.5%). 16 cases (8%) of endometrial hyperplasia without atypia and 7 cases (3.5%) of endometrial polyp were noted. Endometrial hyperplasia with atypia was seen in 4 cases (2%) (Table 9).

The majority of the histopathological findings in fallopian tubes were unremarkable (196, 98.0%). One case each of acute on chronic salpingitis, b/l chronic salpingitis, b/l foreign body granuloma, and b/l hydrosalpinx were also noted (Table 10).

Out of 71 cases who underwent unilateral or bilateral oophorectomy, the most common ovarian tissue pathology reported was b/l corpus albicans (45, 22.5%), followed by bilateral corpus luteal hemorrhagic cysts constituting 5% (10). 2 cases (1%) of left seromucinous cystadenoma and 1 case (0.5%) of b/l benign serous cystadenoma were also noted (Table 11).

The histopathological findings of myometrium, endometrium, and ovaries showed a statistically significant relationship with both clinical diagnosis and USG findings. The histopathological findings of fallopian tubes also showed a statistically significant relationship with USG findings (Table 12, 13).

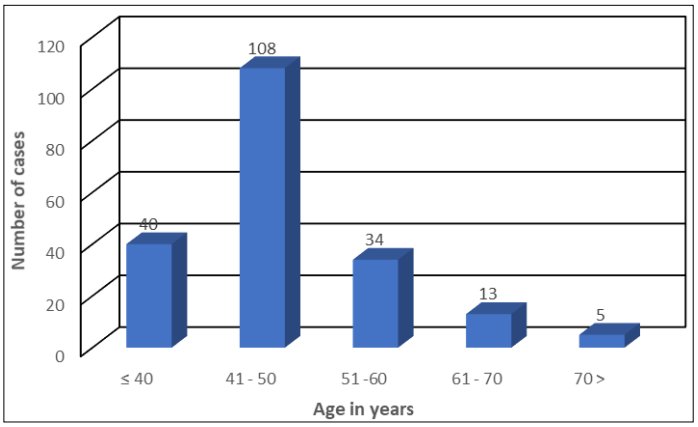

Fig 1: Age Distribution of the Study Population

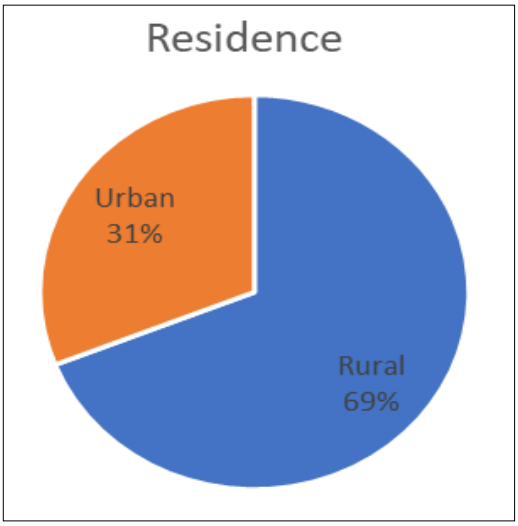

Fig 2: Residence of the Study Population

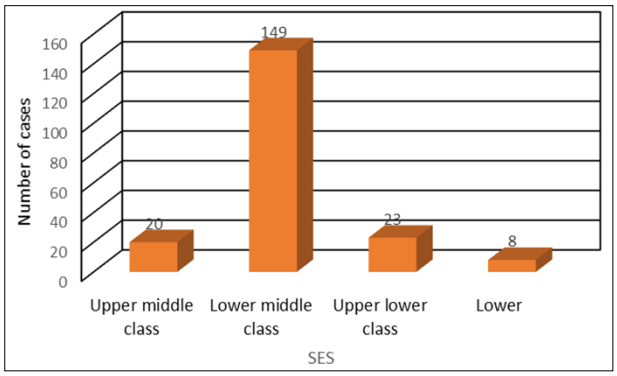

Fig 3: Socio-Economic Status of the Study Population

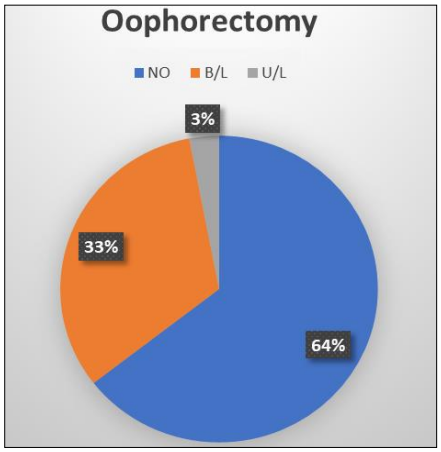

Fig 4: Distribution of Cases According to Oophorectomy

Table 1: Distribution of Cases According to Chief Complaints

Chief Complaints	Number of Cases	Percentage
Dysmenorrhoea	60	30.0
Heavy menstrual bleeding	55	27.5
Mass per abdomen	5	2.5
Mass per vagina	42	21.0
Pain abdomen	25	12.5
White discharge per vagina	13	6.5
Total	200	100.0

Table 2: Distribution of Cases According to Clinical Diagnosis

Clinical Diagnosis	Number of Cases	Percentage
2nd Degree UV prolapse with cystocele with rectocele	1	0.5
3rd Degree UV prolapse	1	0.5
Endometriosis	1	0.5
Cervical elongation	2	1.0
Left ovarian cyst	2	1.0
Fibroid uterus	6	3.0
Pelvic inflammatory disease	28	14.0
3rd Degree UV prolapse with cystocele with rectocele	40	20.0
Abnormal uterine bleeding	119	59.5
Total	200	100.0

Table 3: USG Findings of the Given Cases in the Study Population

USG Findings	Number of cases	Percentage
Bulky fibroid uterus	66	33.0
Uterine descent	42	21.0
PID	27	13.5
Adenomyosis	26	15.5
Endometrial polyp	4	2.0
Bulky fibroid uterus with adenomyosis	4	2.0
Bulky fibroid uterus with B/L ovarian cysts	3	1.5
Thickened endometrium	3	1.5
Bulky fibroid uterus with left ovarian endometriotic cyst	2	1.0
Left ovarian cyst	2	1.0
Cervical elongation	2	1.0
Bulky fibroid uterus with endometrial polyp	2	1.0
Adenomyosis with left ovarian endometriotic cyst	2	1.0
Adenomyosis with B/L ovarian cysts	2	1.0
Bulky fibroid uterus with right ovarian endometriotic cyst	1	0.5
Bulky fibroid uterus with right ovarian cyst	1	0.5
Bulky fibroid uterus with endometrial hyperplasia	1	0.5
B/L Tubo ovarian mass	1	0.5
Bulky fibroid uterus with simple right ovarian cyst	1	0.5

Adenomyosis with PID	1	0.5
Left ovarian chocolate cyst	1	0.5
Left ovarian chocolate cyst with thickened endometrium	1	0.5
Endometrial polyp with PID	1	0.5
Right ovarian hemorrhagic cyst	1	0.5
Total	200	100.0

Table 4: Types of Hysterectomy

Hysterectomy	**Number of cases**	**Percentage**
TLH with BLS	88	44.0
VH with BSO with PFR	38	19.0
TAH with BLS	24	12.0
TLH with BS with Left Ovariotomy	17	8.5
VH with BLS	15	7.5
TAH with BSO	8	4.0
TLH with BS with Left Ovariotomy	2	1.0
VH with BLS with PFR	2	1.0
VH with BSO	1	0.5
TLH with BLS with Right Oophorectomy with Left Ovariotomy	1	0.5
TAH with Right Salpingectomy with Left Salpingo-oophorectomy	1	0.5
VH with Right Salpingo-oophorectomy with Left Salpingectomy	1	0.5
Total	200	100.0

Table 5: Distribution of Cases According to Pap Smear

Pap smear	Number of cases	Percentage
ASCUS	1	.5
Atrophic Smear	33	16.5
HSIL	1	.5
Inflammatory Smear	52	26.0
LSIL	1	.5
NILM	112	56.0
Total	200	100.0

Table 6: Histopathological Findings in Myometrium

Myometrium	**Number of cases**	**Percentage**
Leiomyosarcoma	1	.5
Leiomyoma	53	26.5
Normal	70	35.0
Adenomyosis With Leiomyoma	51	25.5
Adenomyosis	25	12.5
Total	200	100.0

Table 7: Histopathological Findings in Cervix

Cervix	**Number of cases**	**Percentage**
Chronic Cervicitis	123	61.5
Chronic Erosive Cervicitis	32	16.0
Chronic Cervicitis with Nabothian Cyst	28	14.0
Chronic Erosive Cervicitis with Nabothian Cyst	15	7.5
Chronic Cervicitis with Squamous Metaplasia	1	0.5
Atrophied Cervix with Nabothian Cyst	1	0.5
Total	200	100.0

Table 8: Histopathological Findings in Endometrium

Endometrium	**Number of cases**	**Percentage**
Secretory Endometrium	59	29.5
Proliferative Endometrium	37	18.5
Senile Cystic Atrophy	36	18.0
Endometrial Hyperplasia Without Atypia	16	8
Poorly Fixed Endometrium	14	7.0

Non-secretory Endometrium	12	6.0
Endometrial Polyp	7	3.5
Late Secretory Endometrium	4	2.0
Decidualized Endometrium	4	2.0
Endometrial Hyperplasia with Atypia	4	2
Menstruating Endometrium	2	1.0
Pill Endometrium	2	1.0
Atrophic Endometrium	2	1.0
Endometritis	1	0.5
Total	200	100.0

Table 9: Histopathological Findings In FT

FT	Number of cases	Percentage
Acute On Chronic Salpingitis	1	0.5
B/L Chronic Salpingitis	1	0.5
B/L Foreign Body Granuloma	1	0.5
B/L Hydrosalpinx	1	0.5
Unremarkable	196	98.0
Total	200	100.0

Table 10: Histopathological Findings in Ovaries (n=71)

Ovaries	Number of cases	Percentage
B/L Corpus Albicans	45	22.5
B/L Corpus Luteal Hemorrhagic Cyst	10	5.0
B/L Chocolate Cyst	3	1.5
Left Corpus Luteal Hemorrhagic Cyst	2	1.0
Left Seromucinous Cystadenoma	2	1.0
B/L Corpus Luteal Cyst	1	0.5
Left Chocolate Cyst	1	0.5
B/L - Normal	1	0.5
B/L Benign Serous Cystadenoma	1	0.5
Right Corpus Albicans with Left Corpus Luteal Hemorrhagic Cyst	1	0.5
Right Corpus Luteal Hemorrhagic Cyst	1	0.5
Right Corpus Luteal Hemorrhagic Cyst with Left Chocolate Cyst	1	0.5
Right Corpus Luteal Hemorrhagic Cyst with Left Endometriosis	1	0.5
Total	200	100.0

Table 11: Relationship between the Histopathological finding with Pre-Operative Clinical Diagnosis

Variables	Chi-Square	p-value
Myometrium Vs Clinical Diagnosis	146.74	0.000 (P<0.05), High Statistical Significance
Cervix Vs Clinical Diagnosis	3.89	0.72 Not Statistically Significant
Endometrium Vs Clinical Diagnosis	333.92	0.000 (P<0.05), High Statistical Significance
FT Vs Clinical Diagnosis	8.21	1.00, Not Statistically Significant
Ovaries Vs Clinical Diagnosis	377.62	0.000 (P<0.05), High Statistical Significance

Table 12: Relationship between the Histopathological finding with Pre-Operative Radiological Findings

Variables	Chi-Square	p-value
Myometrium Vs Radiological Findings	189.01	0.000 (P<0.05), High Statistical Significance
Cervix Vs Radiological Findings	3.71	0.987, Not Statistically Significant
Endometrium Vs Radiological Finding	485.34	0.000 (P<0.05), High Statistical Significance
FT Vs Radiological Finding	112.84	0.000 (P<0.05), High Statistical Significance
Ovaries Vs Radiological Findings	544.800	0.000 (P<0.05), High Statistical Significance

Discussion

In this study, majority of the patients were in the age group of 41-50 years (54.0%). In a similar study by Yogesh Neena *et al* [10], maximum cases (54.16%) were in 45-55 years. In a study by Talukdar B *et al* [11], 67.97% of patients were in the age group of 45-55 years. In a study by Vasudeva S *et al* [1], the mean age of cases was 41.2±7.8 years and the majority of the cases of perimenopausal uterine bleeding were in the age group of 45-55 years (61%). The patients corresponding to parity of 1-3 contributed significantly that is 75% of total patients followed by multipara patients of parity 4-5 in our study. This is in accordance with the study conducted by

Vasudeva S *et al* [1] where the mean parity of the patients was 2.8 with a peak parity of 1-3 in 379 (75.8%) cases and seven patients were nulliparous.

The commonest symptom at the time of presentation was dysmenorrhea (60, 30%), followed in decreasing order by heavy menstrual bleeding (55, 27.5%), mass par vagina (42, 21%) abdominal pain (25, 12.5%), white discharge per vaginum (13, 6.5%), and mass per abdomen (5, 2.5%). In a study conducted by Mehla S [8] the histological correlation of dysmenorrhea with adenomyosis was seen in 73.68% of cases whereas in leiomyoma the correlation with pain and pressure symptoms was 87.77%.

In this study, the commonest clinical indication of hysterectomy was abnormal uterine bleeding (119, 59.5%) followed by uterovaginal prolapse (42, 21.0%) and pelvic inflammatory disease (28, 14.0%). This was similar to the studies conducted by Vasudeva S *et al* [1] and Yogesh Neena *et al* [10] where abnormal uterine bleeding was the commonest indication for hysterectomy.

The most common USG confirmed clinical indication for hysterectomy was fibroid uterus (66, 33.0%), followed by uterine descent (42, 21.0%), PID (27, 13.5%), and adenomyosis (26, 15.5%), which is in agreement with various other studies. Khan *et al* [12] and Khaniki *et al* [13] also reported fibroid to be the most common indication in their study while in a study done by Rizvi *et al* [14], adenomyosis was the commonest pathology 46.34% followed by leiomyoma 41.46%. Jha *et al* [15] stated that uterovaginal prolapse was the most common clinical indication of hysterectomy in their study. In a study conducted by Shams R *et al* [2], the most common indication for hysterectomy in the reproductive group (30-50 years), was leiomyomas followed by adenomyosis. Transabdominal sonography doesn't allow reliable diagnosis of adenomyosis, even transvaginal ultrasonography has limitations in tissue characterization. MRI is more helpful to diagnose adenomyosis but is expensive, whereas it is very useful diagnostic tool in cases with fibroid uterus. [8]

The majority of pap smear findings reported in our study were NILM (12, 56.0%), followed by inflammatory smear (52, 26%), and atrophic smear (33, 16.5%). One case each of ASCUS (0.5%), Low-Grade Squamous intraepithelial lesion (LSIL) (0.5%), and High-Grade Squamous intraepithelial lesion (HSIL) (0.5%) were also noted. In a study conducted by Sharma P *et al* [3], LSIL was seen in 8 cases while HSIL was seen in 2 cases, 18 cases of carcinoma cervix were seen and all were squamous cell carcinomas.

The commonest approach for hysterectomy was laparoscopic i.e., total laparoscopic hysterectomy with bilateral salpingectomy in 88 (44%) cases, followed by vaginal hysterectomy with bilateral salpingo-oophorectomy with pelvic floor repair (38, 19%) and total abdominal hysterectomy with salpingectomy (24, 12%). Non-Descent Vaginal Hysterectomy was the commonest hysterectomy procedure performed (64%) in a study by Vasudeva S *et al* [1]. Bosco RJ [4] reported total abdominal hysterectomy with bilateral salpingo-oophorectomy as the most common type of hysterectomy done.

Leiomyoma was the commonest histopathological lesion found in the myometrium (53, 26.5%). Leiomyomas were either the predominant pathology or were seen as an additional finding to another pathology. Comparable distribution was also seen in studies by Thaker BD *et al* [16], Ranabhat SK *et al* [17], and Rather GR *et al* [18]. Adenomyosis with leiomyoma (51, 25.5%) was the second commonest myometrial pathology in our study followed by adenomyosis alone (25, 12.5%). Comparable results were seen in previous studies. [18, 19] Adenomyosis is quite difficult to diagnose preoperatively and is mostly diagnosed after hysterectomy on histopathological examination. A single case of leiomyosarcoma was also seen in our study similar to previous studies [16-19].

In case of endometrial findings, secretory endometrium was the commonest finding in 59 cases (29.5%), followed by proliferative endometrium in 37 cases (18.5%). 16 cases (8%) of endometrial hyperplasia without atypia and 7 cases (3.5%) of endometrial polyp were noted. Endometrial hyperplasia with atypia was seen in 4 cases (2%). Endometrial hyperplasia was seen in 25.2% (65 out of 258) cases of AUB in a study conducted by Bosco RJ [4]. Sajitha *et al* [20] reported 25% endometrial hyperplasia in AUB cases.

Chronic cervicitis was the commonest cervical pathology in our study (123, 61.5%) similar to previously published studies by Rather GR *et al* [18], Patil HA *et al* [19], and Sharma P *et al* [3].

The removal of ovaries without the suspicion of any pathology seems to be unnecessary because removal of ovaries leads to estrogen hormone deficiency, hastens up menopause and the patient's psychosexual health is affected. Bilateral oophorectomy is a routine in our hospital after 50 years of age in patients undergoing hysterectomy for other reasons. The most common ovarian tissue pathology reported was B/L corpus albicans (45, 22.5%), followed by bilateral corpus luteal hemorrhagic cysts constituting 5% (10). Sharma P *et al* **[3]** reported cysts of variable morphology as the most common pathology noted and the majority were simple follicular cysts.

Limitations

This is a retrospective study done on 200 patients. A larger sample size will have a better correlation of the clinical, radiological & histopathological findings.

Conclusion

Every hysterectomy specimen should be subjected to histopathological examination. This study highlights the fact that even if the gross appearance of the specimen is normal, a few incidental findings make it important to subject all hysterectomy specimens to histopathological analysis. Also, some pathologies can be missed clinically and ultrasonographically, so it is important to relate clinicopathological findings with

ultrasonographical findings in all cases of hysterectomy, to improve the clinical outcome and post-operative management.

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