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Original Research Article

A study of histomorphological features of fallopian tube and immunohistochemical stains for p53 & ki67 of the fimbrial end of fallopian tube

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ABSTRACT

Background: Fallopian tube is the origin of ovarian cancer especially high grade serous carcinoma. Precursor lesion of ovarian cancers in the fallopian tube now recognized includes p53 signature, secretory cell outgrowth (SCOUT), tubal intraepithelial lesion in transition (TILT) and serous tubal intraepithelial lesion (STIC) through histomorphological features and by using immunohistochemical staining for p53 and ki67. This study emphasizes in detection of precursor lesion in fallopian tube in all resected fallopian tube submitted in the department during the study period. Ability to detect precursor lesion would have profound impact on preventive strategies of ovarian cancer and modalities of management of the disease in the initial stages that ultimately help in reducing the disease burden and increasing overall survival rate.
Aim and Objectives: To determine the histomorphologiscal features of fallopian tube and to assess the evidence of precursor lesions in fallopian tube epithelium using immunohistochemistry stain p53 and ki67.
Materials and Methods: The study was carried out in the department of pathology in collaboration with the department of obstretics and gynecology, regional institute of medical sciences. Study was conducted for two years from September 2018 to August 2020. All the fallopian tubes specimen received during the study period were included in the study except those specimen with damaged, autolyesd, of post radiation therapy and post chemotherapy patients. A total of 120 specimen were collected.
Result: A total of 120 samples were included in the study. Mean age of the participants was 47 years with a minimum age of 24 years and maximum age of 72 years. 56. 7 % of the participants were in post menopausal age group. Out of the 120 cases only 12 cases (10 %) showed p53 signature and one case (0.8%) showed presence of STIC.
Conclusion: Only one case of STIC was detected in the fallopian tube where the ovary had High grade serous carcinoma. Few cases showed for p53 signature evident by using IHC p53 and ki67 which is more frequent in corresponding ovarian pathology than uterine pathology.

1. Introduction

Fallopian tube or salpinx is a tubular hollow structure measuring 11-12 cm that runs throughout the apex of the broad ligament and spans between the uterine cornus and the ovary. It is divided into four segments – intramural that is inside the uterine wall, isthmus which is 2-3 cm thick walled, ampulla that is a thin walled expanded area and infundibulum, a trumpet shaped ending that open in the peritoneal cavity through ostium and fringed by fimbriae.[1] Fallopian tube is derived from the cranial vertical portion and horizontal part of paramesonephric duct (mullerian duct) in the presence of estrogen and absence of testosterone and anti mullerian hormone.[2] The inner aspect

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of the tube is lined by mucosa arranged in the shaped of longitudinal branching folds (plicae).[1] These plicae are most prominent in ampulla and these branching folds have vascular supporting tissue.[3] The plicae becomes blunted in post-menopausal state secondary to contraction of lining and decrease in epithelial cells.[4]

The Fallopian tube is lined by non-stratified epithelium that is separated from the endosalpingeal stroma by a basement membrane.[4] The epithelium consists of three distinct cell types – secretory, ciliated and intercalated (peg) cells.[1] Ciliated cells are most common followed by secretory cells. Ciliated cells are shorter than secretory cells making epithelial surface irregular.[3] They are most prominent at the ovarian end of the tube particularly in fimbrial mucosa and predominate during mid cycle. The number progressively diminished to achieve nadir at the time of menstruation. Secretory cells most often have ovoid nuclei and they may contain an apical vacuole. They are most prominent in the uterine end of the tube and undergo cyclical change in cell height and appearance reflecting their elaboration, accumulation and discharge of oviduct secretion as menstrual cycle proceeds.[4] These cells produce a secretion that is propelled towards the uterus by the wave like beating of the cilia of the ciliated cells. This secretion has a role in the nutrition and protection of the ovum.[3] The peg cells is in reality a stage in cyclic variation during the menstrual cycle of secretory cells. These cells are thought to represent either effete secretory cells or some type of reserved cells. The number of the three types of cells in each anatomic region undergoes regular variation in throughout menstual cycle.[4] Endocrine cells have been found only exeptionally.[1] Scattered intraepithelial lymphocytes are also found.Muscular wall (myosalpinx) composed of inner circular and outer longitudinal layer. The isthmus also possesses an inner longitudinal layer. The outer serosal layer has a surface lining of mesothelium. the lymphatics of the fallopian tube leaves wall within the mesosalphinx where they join efferent lymphatics from the ovary and the uterus and follow ovarian vessel to terminate in the aortic lymph node. Fallopian tube carries ova from the surface of the ovaries to the uterine cavity and also the site of fertilization by spermatozoa.[3] Common disorders of fallopian tube include inflammatory disease like acute salpingitis, chronic salpingitis, granulomatous salpingitis, metaplasia including mucinous, endometrioid and transitional cell (Walthard cell nest), torsion, arias stella reaction, decidual reaction, salpingitis isthmica nodosa etc. Tumors of fallopian tube are uncommon.[5] Nevertheless, recent research and studies have shown that fallopian tube is the origin of ovarian cancer especially high grade serous carcinoma. Precursor lesions of the ovarian cancer in the fallopian tube now recognized include p53 signature, secretory cell outgrowths (SCOUT), tubal intraepithelial lesion in transition (TILT) and serous tubal intraepithelial lesion (STIC).[6] P53 signature is characterized by a strip of normal appearing fallopian tube epithelium at least 12 cells in length with strong nuclear p53 positivity. Some of these lesions have been reported to harbor TP53 mutation. The lesion cannot be detected morphologically. It is diagnosed only by immunohistochemistry because of strong nuclear p53 positivity and ki67 proliferative index of less than 10%. p53 signature may represent only the first step- it will either further develop or will persist. The cell in this lesion can be seen as either uninterrupted sequence or interrupted ciliated cells that were p53 negative. P53 signature is considered as precursor lesion of STIC.[7] SCOUT is characterized by secretory outgrowth. This entity contains a discrete expansion of at least 30 epithelial cells of secretory type (Bcl2 positive and p53 negative). They are seen to be equally involved in the carcinogenesis of process and gradual formation of pelvic serious carcinoma as p53 signature. SCOUT lesion is distinguished by Bcl2 positive secretory cells proliferation and loss of PAX2. The loss of PAX2 in STIC and high grade serous carcinoma (HGSC) suggest that inactivation of this gene, while integral to neoplasia, has a wider range of association and, may signify a generic pathway common to epithelial cell expansion.[7] They are believed to be associated with HGSC of ovary but do not directly participate in the carcinogenesis therefore they are also called surrogate precursor.[6] TILT also designated as serous tubal intraepithelial lesion (STIL) or proliferative p53 signature is an intermediate between p53 signature and STIC. This lesion displays cytological atypia but falls short of STIC.[7] The nature of this lesion and its relationship to STIC have not been clearly established. However, it represents low / moderate proliferative index and p53 accumulation.[6] STIC diagnosis is based on assessment of combination of morphological and immunohistochemical features. It is classified by the presence of malignant cells replacing the tubal epithelium.[8] The morphological abnormality include an increase in the N/C ratio, enlarged nuclei with prominent nucleoli, reduction in ciliated cells, loss of polarity but with no penetration through the basement membrane.[7] Other additional features that are present are epithelial stratification, small fracture lines in the epithelium and exfoliation of small epithelial clusters from the surface with or without degenerative changes.[8] Immunohistochemical features supporting STIC are P53 (overexpression of > 60% or no expression) and increased ki67 proliferative index. The overexpression of laminin y 1 immunoreactivity and alteration of its staining pattern in STIC serve as a useful tissue bio marker, especially for those STIC that are negative for p53 and have low ki67 labeling index.[7] STIC are found in 50-60% in sporadic (without BRCA mutation) cases of ovarian, tubal and primary peritoneal high grade serous carcinoma. STIC is detected in approximately 10- 15% of fallopian tubes removed prophylactically from women at high risk of

developing ovarian cancer with a germline BRCA mutation and the detection frequency increases with increase in age. The mean age of detection of STIC in BRCA1 carrier is found to be younger than in BRCA 2 carrier. It is estimated that detection of STIC in non- BRCA mutation carriers is much lower.[6] STIC is probably the earliest histologically recognizable lesion in the pathogenesis of serous neoplasm including both low grade and high grade serous carcinoma. Therefore, routine histological examination of the fimbriae provides opportunity to detect their early malignancy.[9] Despite intensive research, advances in techniques, optimized modalities of invasive and noninvasive management of ovarian cancer, the overall survival rate has shown only limited improvement over the last few decades. This is chiefly due to the fact that ovarian cancer is still diagnosed at an advanced stage due to limited knowledge of effective screening strategies.[10] To optimize the detection of precursor lesion in fallopian tube, the protocol for sectioning and extensive examining the fimbriae (SEE-FIM) has been established.[6] Early detection utilizes immunohistochemistry markers like p53, Ki-67, PAX2, Bcl2, yH2AX and ALDH1.[7] Commonly p53 and Ki-67 can be used to enhanced the immunohistochemical studies for early detection of precursor lesion of fallopian tube epithelium.[11] The p53 gene that codes for the protein is located at 17p13 regulates the cell cycle and hence functions as tumour suppressor. p53 protein is a phosphoprotein made up of 393 amino acids and contains a domain that activates transcription factor domain that recognizes specific DNA sequence, a domain responsible for tetramerisation of the protein. Domain that recognizes DNA damages plays a prime role in cell cycle and control apoptosis. Defective p53 allows abnormal cells to proliferate resulting in neoplastic changes.[12,13] Ki-67 is a nuclear protein that is expressed during various stages in cell cycle chiefly during late G_1, S, G_2 and M phases. The protein has a fork head associated domain (FHA) through which it associates with the euchromatin at the perichromosomal layers, the centromeric heterochromatin and the nucleolus. Ki67 is shown to have a cell cycle dependent topographical distribution with perinuclear expression at G_1, expression in nuclear matrix at G_2 and expression on the chromosome during M phase. Ki67 is commonly used as proliferation marker since it is not detected in Go cells but increase gradually from G_1 to mitosis.[14] This study emphasizes on detection of precursor lesion in fallopian tube including p53 signature, STIC, SCOUT and TILT in resected fallopian tube of every patient performing salpingectomy. Ability to detect precursor lesion would have profound impact on preventive strategies of ovarian cancer and the modalities for management of the disease in the initial stages that ultimately help in reducing the disease burden and increasing the overall survival rate.

2. Materials and Methods

2.1. Aims and objectives

1. To determine the histomorphological features of fallopian tube.
2. To assess the evidence of precursor lesions in fimbrial end of fallopian tube epithelium using immunohistochemical staining for p53 and ki67.

2.2. Study design

The study was a hospital based cross sectional study carried out in the Department of Pathology, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur, in collaboration with Department of Obstetrics & Gynecology, RIMS, Imphal. The study was conducted for two years from September 2018 to August 2020. All fallopian tubes received along with hysterectomy specimen in the Department of Pathology, RIMS for histopathological examination were studied.

2.3. Selection criteria

All fallopian tube specimens received in the pathology department during the study period. Those who had given written consent. Samples from post radiation therapy and post chemotherapy patients were excluded from the study. Tubes with fimbrial end missing or damaged or impossible for pathologist to analyse, autolysed samples, specimen of ectopic pregnancy were excluded

2.4. Sample size

All fallopian tube samples received in the department of pathology, RIMS in the study period of 2 years were included in the study. A total of 120 cases were collected.

2.5. Data collection and analysis

Histomorphological examination were done to all the 120 cases after the Hematoxylin and eosin stain. Immunohistochemistry for p53 and ki67 were also done. All the data collected were entered into SPSS (IBM) Version 21 and descriptive statistical methods like mean, standard deviation, percentages were applied. Chi square test was used to find the association between relevant variables. p value < 0.05 was taken as significant.

Independent variables included were age, ethnic groups for all the cases.

3. Results and Observation

A total of 120 samples were included in the study. Mean age of the participants was 47.7 ± 9.0 years with a minimum age of 24 years and maximum age of 72 years. The following results were recorded and analyzed. 56.7% of the participants were in post-menopausal age group and

remaining 43.3% of the participants were in pre-menopausal age group.

As shown in Table 1, most common age group among the participants with uterine or ovarian pathology is 41-50 years which is 57.5% and followed by age group of 51-60 years which is 16.7%. The least age group among the participants is 71-80 years with only 1 case (0.8%).

In the present study, maximum number of participants were of Hindu religion which is 65% followed by Christianity (14.2%) and Islam (16.7%). The least common group belongs to other religions like Buddhist and Sikhism.

In the present study all the participants have undergone total abdominal hysterectomy with bilateral salpingo-oophorectomy. As shown in Table 2, the indication of surgery was mostly due to leiomyoma uteri which is 54 (45.0%) and followed by ovarian tumor which accounts for 50 (41.7%). Only 2 cases each (1.7%) have undergone surgery due to cervical intraepithelial lesion and postpartum hemorrhage.

The uterine pathology which accounts for 67 cases (55.8%) is more common than the ovarian pathology which is found in 53 cases (44.2%) among the final diagnosis of total abdominal hysterectomy with bilateral salpingo-oophorectomy.

Out of 120 cases 55(45.8%) cases were diagnosed as leiomyoma uteri with chronic cervicitis followed by 24 (20.0%cases) of serous cyst adenoma. Two cases (1.7%) of low grade intraepithelial lesion were diagnosed. Only one case (0.8%) each of serous cyst carcinoma of ovary, granulosa cell tumor and Malignant Brenner tumor were diagnosed.

Out of the 120 cases, of age group of 45 years or less showed more cases of uterine pathology which comprised of 36 cases (69.2%). However, participants above more than 45 years showed more cases of ovarian pathology which is significant with a p-value of 0.01.

66 cases (55%) show no significant abnormality in the fallopian tube and the remaining 54 cases showed a spectrum of histopathological findings. Out of 54 cases showing histomorphological changes in the fallopian tube, the most common histopathological findings were congestion of the tubal wall with some showing extravasation erythrocytes in the wall of the tube which accounts for 24cases (20%), followed by paratubal cyst 13(10.8%). 11 cases (10%) showed Walthard cell nest and 5 cases (4.2 %) showed histomorphological features of salpingitis showing dense inflammatory infiltrates in the muscle layer of the tubal wall. Only a single case of serous tubal intraepithelial lesion (0.8%) was diagnosed.

Out of 120, cases 66 (53.3%) cases have shown no significant abnormality in the fallopian tube. Among the remaining 54 abnormalities involving the fallopian tube, the site of involvement of fallopian tube was maximum in ampullary region with 30 (25.0%) cases and 20 (16.7%) in infundibulum. The least involved region is the fimbrial end of fallopian tube with 4 (3.3%) cases.

Out of 120 cases stained using standard protocol for p53 IHC marker, maximum cases which is 79 (65.8%) showed no staining in the cytoplasm or nucleus of the epithelial cell lining of the fallopian tube. 26 cases (21.7 %) showed mild nuclear staining in the epithelial cell lining.

A negative staining or mild staining is present in a normal or reactive epithelial cell lining. Moderate staining and intense staining were shown in 6 cases (5%) and 9 cases (7.5%) respectively. Moderate and intense nuclear staining of the fallopian tube epithelial cells is taken as significant to consider the presence of precursor lesion.

Fallopian tube sections of all cases were stained and out of 120 cases majority of the epithelial cell lining showed no staining. Out of 24 cases that showed staining of ki67, 23 cases showed staining in less than 10% of cells and only one case showed more than 10% of cell stained. No cases showed more than 50% of cell staining of ki67 in the epithelial cell lining.

Out of 120 cases studied, 108 cases (90%) showed no p53 signature and only 12 cases (10%) of fallopian tubes studied, showed p53 signature. Figures 5 and 6 shows the Ki67 staining and p53 staining of the fallopian tube.

In the present study, as shown in the Table 7, ovarian pathology showed more number 10(18.9%) of p53 signature present in the fallopian tube epithelial cell lining as compared to the uterine pathology and this is significant with chi square test being applied with a p-value of 0.004.

As shown in Table 8, p53 signature showed more positivity in participants whose age is 45 years or less which accounts for 6 cases (11.5%). Participants with ages more than 45 years showed lower rate of p53 signature positivity. A valid chi square is applied which gives a p-value of 0.6 which is not significant.

Among all the 120 cases studied only 1 case (0.8%) of serous tubal intraepithelial carcinoma (STIC) is found. The fimbrial end of the fallopian tube was involved in STIC and was positive in the case of ovarian serous carcinoma. Other precursor lesions like secretory outgrowth (SCOUT) and serous tubal intraepithelial lesion (STIL) was not found in any of the fallopian tubes studied.

Table 1: Distribution of the age group (N=120)

Age group (Years)	Frequency (n)	Percentage
21-30	3	2.5
31-40	15	12.5
41-50	69	57.5
51-60	20	16.7
61-70	12	10.0
71-80	1	0.8

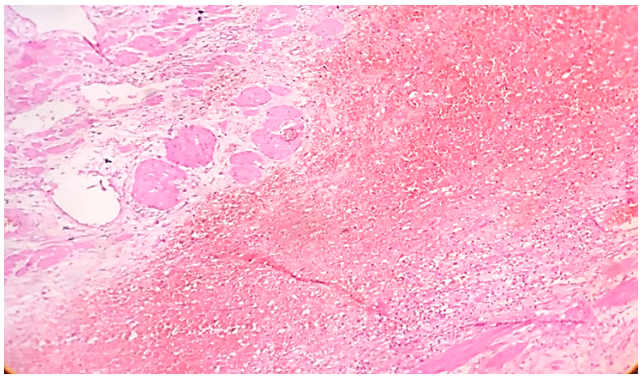

Figure 1: Photomicrograph of fallopian tube showing congestion in between myosalpinx. (H&E 10X)

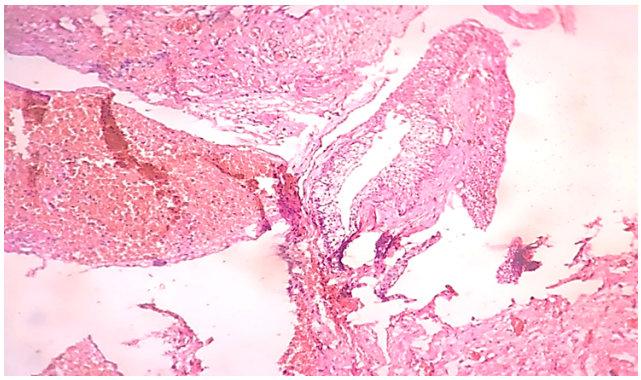

Figure 2: Photomicrograph of fallopian tube with Walthard cell nest. (H&E 10X)

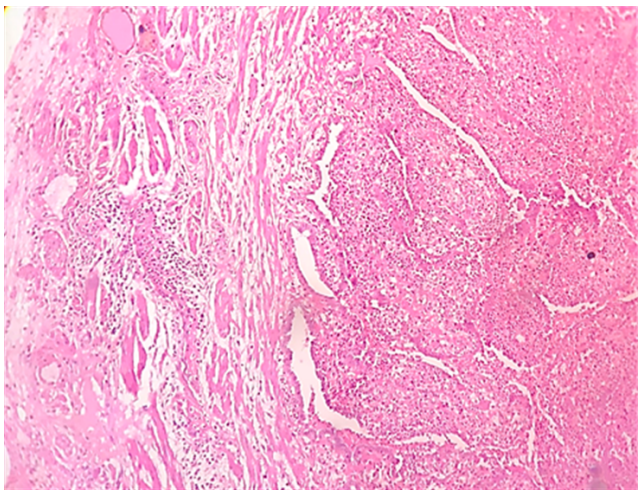

Figure 3: Photomicrograph of fallopian tube showing features of acute salpingitis. (H&E 10x)

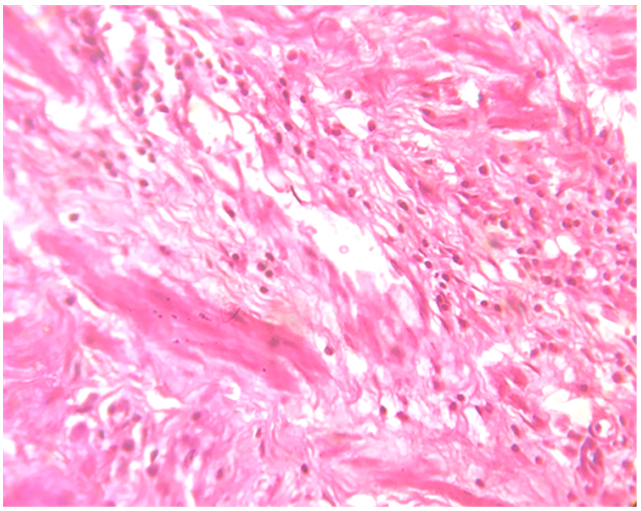

Figure 4: Photomicrograph of fallopian tube showing features of acute salpingitis. (H&E 40x)

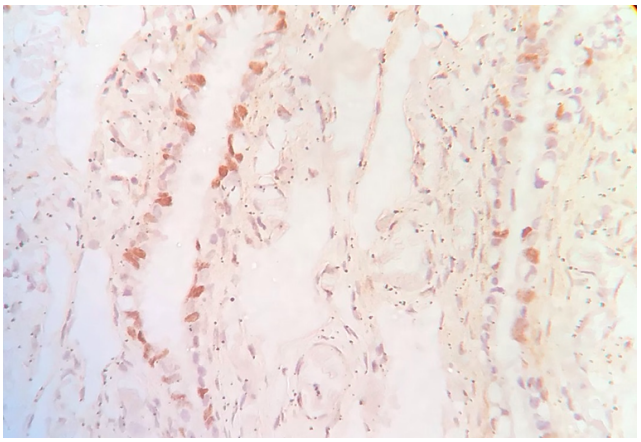

Figure 5: Photomicrograph of fallopian tube showing Ki67 staining in less than 10% of cell. (IHC stain, 10X)

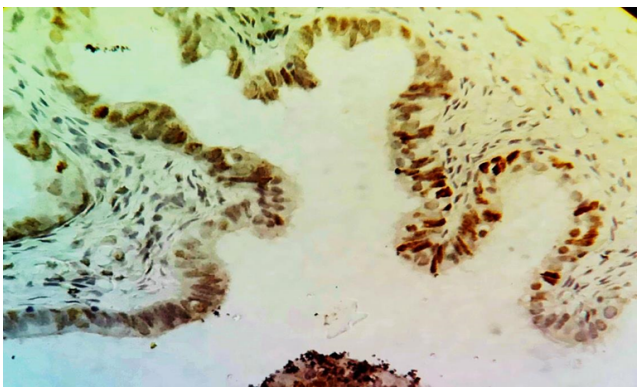

Figure 6: Photomicrograph of fallopian tube showing positive p53 staining. (IHC stain, 10X)

Table 2: Indication of surgery

Indication	Frequency (n)	Percentage (%)
Leiomyoma uteri	54	45.0
Ovarian tumor	50	41.7
Uterine prolapse	8	6.7
Torsion of ovary	3	2.5
Cervical intraepithelial lesion	2	1.7
Postpartum hemorrhage	2	1.7
Cervical polyp	1	0.8

Table 3: Distribution of diagnoses (N = 120)

Diagnosis	Frequency (n)	Percentage
Leiomyoma and chronic cervicitis	55	45.8
Serous cystadenoma of ovary	24	20.0
Mature cystic teratoma	15	12.5
Mucinous cyst adenoma	13	9.2
Adenomyosis	7	0.8
*Others	4	3.3
Low grade cervical intraepithelial lesion	2	1.7
Postpartum/ decidual change	2	1.7

Table 4: Correlation of age group with uterine/ovarian diagnosis

Age (years)	Diagnosis		p-value
	Uterine pathology n (%)	Ovarian pathology n (%)	
</=45	36 (69.2)	16 (30.8)	0.01
>45	31 (45.6)	37 (54.4)	

Table 5: Distribution of histomorphological findings offallopian tubes

Histopathological findings of fallopian tube	Frequency (n)	Percentage
No significant pathology	66	55
Congestion	24	20
Paratubal cyst	13	10.8
Wathard cell nest	11	10
Salpingitis	5	4.2
STIC	1	0.8

Table 6: Site of fallopian tube involvement

Site	Frequency	Percentage
No involvement	66	53.3
Ampulla	30	25.0
Infundibulum	20	16.7
Fimbria	4	3.3

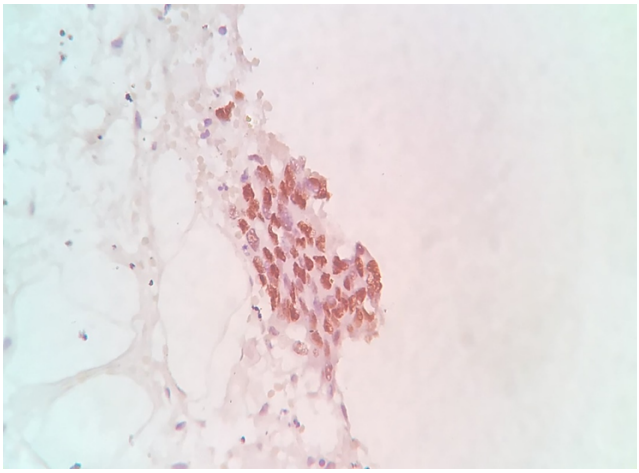

Figure 7: Photomicrograph of fallopian tube showing positive p53 staining in STIC. (IHC stain, 10X)

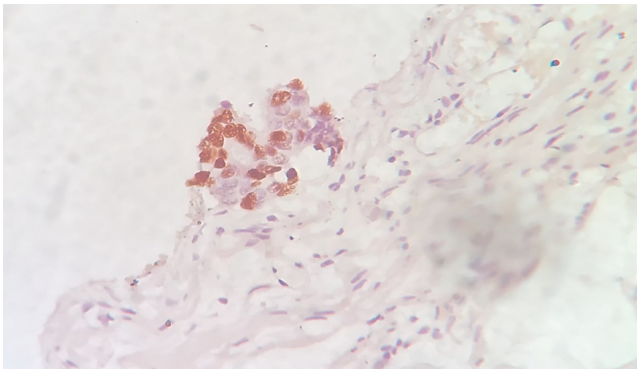

Figure 8: Photomicrograph of fallopian tube showing ki 67 positive in STIC. (IHC stain, 10X)

Table 7: Association of uterine /ovarian diagnosis with p53 signature

Diagnosis	P53 signature		P value
	Negative n (%)	Positive n (%)	
Uterine pathology	65 (97.0%)	2 (3.0%)	0.004
Ovarian pathology	43 (81.1%)	10 (18.9%)	

Table 8: Association of age group with p53 signature

Age group	P53 signature		P value
	Negative n (%)	Positive n (%)	
</= 45 years	46 (88.5%)	6 (11.5%)	0.6
>45 years	62 (91.2%)	6 (8.8%)	

4. Discussion

Epithelial ovarian tumors are most lethal malignancies of female genital tract. Among all ovarian tumors most lethal is serous carcinoma since it is invariably diagnosed at a late stage after having spread to adjacent peritoneal surfaces. Traditionally, serous carcinoma has been presumed to have arisen from ovarian surface epithelium. However, since late 1990s evidences have been accumulated to support alternate origin that is from the distal fallopian tube. Four precursor lesions have been identified in fallopian tube epithelium that are p53 signature, serous tubal intraepithelial carcinoma (STIC), secretory outgrowth (SCOUT) and serous tubal intraepithelial lesion (STIL). Therefore, thorough histopathological examination of fallopian tubes should be enacted to determine any pathological lesions including the precursor lesions.

In the present study the age of the patients undergoing surgical procedure for total abdominal hysterectomy ranges from 24 years to 72 years with a mean age of 47.7 however in study of Hunt JZ et al[15] the age of study population ranged from 11 to 79 years of age with a mean of 41 years, Nishida N et al[16] studied on patients from 16 to 81 years of age with mean age of 47.4. Cheng A et al[17] had the study population with age 35 to 64 years with mean of 48.5. Rabban JT et al[18] studied on age group ranging from 13 years to 91 years with mean age of 52 years.

In the present study, uterine pathology was found to be more common than ovarian pathology. Leiomyoma uteri accounts for 45.8% was the majority of cases diagnosed which was comparable to the study conducted by Patel J et al[19] that had fibroid 36.28% as the maximum cases diagnosed in the study. This can also be correlated to the study of Bagwan IN et al[20] which had maximum cases of leiomyoma comprising of 30% in the study and with the study of Rabban JT et al[18] which had 32.7% leiomyoma in the study. The most common diagnosis given in each study was similar to the present study. However, in the study of Nishida N et al[16] the most common pathology was ectopic pregnancy which comprised of 33.3% which is contradictory to the present study. The reason for the contradiction may be due to exclusion of tubal pathology due to ectopic pregnancy in the present study.

In this study the second most common cases of hysterectomy were of serous cyst adenoma which comprised of 20%. 12.5% of cases had mature cystic Teratoma. Only 3 cases had malignant tumour of the ovary. Among the malignant ovarian tumors, only 1 case (0.8%) had serous cyst carcinoma. Other 2 malignant tumors of the ovary were adult Granulosa cell tumor which accounts for 0.08% and malignant Brenner tumor 0.8%. As in this study malignant tumors of the ovary encountered was rare which is akin to the study of Rabban JT et al[18] in which only two cases of ovarian malignancy were documented that were 1 case of Brenner tumor (0.19%) and one case of High grade serous carcinoma of ovary which is 0.19%.

In the present study, examination of the fallopian tubes of the specimens of total abdominal hysterectomy revealed that out of 120 cases, majority of the fallopian tube (55.5%) had shown no significant abnormality. Among the spectrum of fallopian tube lesions/abnormalities the tubal wall shows only congestion in 20.0% cases. Paratubal cyst (10.8%) was the second most common histopathological findings found, however in the study of Patel J et al[19] and Bagwan IN et al[20] most common fallopian tube pathology was salpingitis (7.9%). While in the study of Hunt JZ et al[15] fibrosis was found to be the most common pathological finding of fallopian tube. Nevertheless, in the studies of Gon S et al[21] and Nishida et al the most common pathology in fallopian tube was ectopic pregnancy. In the study of Rajyalakshmi R et al[9] the most common findings were hydrosalpinx and in case of Rabban JT et al[18] it was paratubal cyst. Walthard cell nest was observed in 9.2% histopathological findings.

In the current study, p53 signature was identified using p53 and Ki67 IHC marker in 12 cases which accounts for 10 % of all fallopian tube cases examined in the study which is close to the study by Nishida N et al[16] who reported p53 signature in 9.7% of the total cases examined. While in other studies p53 signature was not documented.

In present study, only one (0.08) case of STIC which comprised of 0.8% was detected out of 120 cases studied. Also in the study of Rajyalakshmi R et al[9] and Cheng A et al[17] 1 case of STIC was observed which accounts for 0.94 % and 4.2% respectively. However, in the study conducted by Rabban JT et al[18] and Ricciardi E et al.[22] STIC was noted in 4 cases which accounts for 0.76% and 7 cases which accounts for 1.7 % respectively.

In this study no cases of SCOUT were observed as akin to the other studies of Rajyalakshmi R et al,[9] Cheng A et al,[17] Rabban JT et al[18] and Ricciardi E et al[22] shown in table whereas in the study of Nishida et al[16] 26 cases of scout was observed which accounts for 21.1% of cases.

In the present study no cases of TILT was observed and this observation is in contrary to other study in which in the study of Nishida N et al[16] TILT was found in 4 cases (3.2%), 1 (0.94%) case in the study of Rajyalakshmi R et al[9] and 16 cases of TILT in the study of Ricciardi E et al[22] which accounts for 3.9% of the total cases.

5. Conclusion

In this study maximum cases among those that had undergone total abdominal hysterectomy and bilateral salpingectomy uterine pathology were more common than the ovarian pathology. Malignant cases were rare in the study. Participants belong to 5^{th} decade in majority. Majority of the fallopian tubes studied showed no significant pathology. However, a spectrum of findings was observed in the examination of the tubes including congestion, paratubal cyst, walthard cell nest, salpingitis. Most histopathological

findings were benign. Only one case of serous tubal intraepithelial lesion was detected in the present study. Precursor lesion not detected by routine H&E stain were picked up as p53 signature using IHC markers of P53 and ki67. Correlation of uterine and ovarian with the age group was statistically significant that conveyed that uterine pathology was detected more in younger age group whereas ovarian pathology was more in the older age group. Correlation of the uterine and ovarian pathology with the positivity of p53 signature was statistically significant and exhibited that p53 signature was more frequently present in corresponding ovarian.

6. Source of Funding

None.

7. Conflict of Interest

None.

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