Original Article

Indian Journal of Pathology: Research and Practice
Volume 6 Number 1, January - March 2017
DOI: http://dx.doi.org/10.21088/ijprp.2278.148X.6117.1

A Prospective Study of Tumor and Tumor Like Lesions of Fallopian Tube

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Abstract

Background and Objectives: Fallopian tubes are the common specimens received in the histopathology laboratory. The recent concept of fallopian tube epithelium as a main source for tubal, ovarian and pelvic carcinoma is becoming common. Hence proper examination of fallopian tube is essential. The aims and objectives of this study is to describe various histomorphological aspects of fallopian tube tumors and tumor like lesions. *Materials and Methods:* Present study is a prospective descriptive study. A total of 361 fallopian tubes specimens were included, these were routinely processed and sections of 5 micron thickness were taken and stained with Hematoxylin and eosin. Detailed gross and microscopic examination was done. *Results:* Total of 361 fallopian tubes were analyzed, pathological lesions were seen in 50.96%(n=184) cases. Out of which 1.38%(n=5) cases showed features of malignancy with primary fallopian tube carcinoma(PFTC) accounting for 0.27%(n=1) cases and metastatic carcinoma accounted for 1.11%(n=4) cases. Tumor like epithelial lesion included salpingitis isthmica nodosa(SIN) which was seen in 0.85%(n=3) cases. *Conclusion:* In the present study most patients (86.89%) had the fallopian tubes removed as a part of hysterectomy which was done for other causes rather than tubal pathology. It was observed that almost half of them had tubal pathology. The present study has made a meticulous attempt and studied the gross and microscopic features of fallopian tube tumors and tumor like lesions and categorized the lesions into various groups.

Keywords: Primary Fallopian Tube Carcinoma(PFTC); Salpingitis Isthmica Nodosa(SIN); Metastatic Carcinoma.

Introduction

Tumors of the fallopian tube are much less common than the corresponding ovarian neoplasms. However fallopian tube shows histologically the same ovarian surface epithelial-stromal tumor subtypes, sex cord-stromal and germ cell tumors are rare. Hydatidiform moles and gestational choriocarcinoma are uncommon complications of tubal ectopic pregnancy [1]. Though fallopian tube being a very rare location of primary or exclusive tumor manifestation, it is now receiving increased attention in gynecological oncology since considerable evidence suggests that it represents the site of origin of many serous pelvic carcinoma [2]. In contrast to malignant tumors, benign tumors of the fallopian tube are rare and most frequent of which are adenomatoid tumors [3]. Other rare benign tumors include papilloma, adenofibroma, cystadenofibroma, metaplastic papillary tumor and endometrioid polyp. These benign tumors are often asymptomatic and incidentally found during surgery. Primary fallopian tube carcinomas(PFTC) are rare amounting for 0.3-1.1% of gynecological malignancies [4], and adenocarcinoma is the most common type. It is possible that the true incidence of PFTC has been underestimated because PFTC may have been mistakenly identified as ovarian tumors during the surgery and/or during microscopic examination by a pathologist as the histological appearance of these tumors are identical. Stage adjusted survival rates are

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(Received on 20.10.2016, **Accepted on** 31.10.2016)

generally better than for epithelial ovarian carcinoma. PFTC has been described in high risk breast-ovarian cancer families with germ line BRCA1 and BRCA2 mutation. Some cases of occult PFTC have been detected at prophylactic salphingo-oophorectomy in BRCA-1 mutation carriers. Therefore the risk for this malignancy should be considered when prophylactic surgery is performed in such high risk women [5]. Tumor like lesions of fallopian tube are proliferations of the tubal mucosa that simulate neoplasms, and they include tubal epithelial hyperplasia, Salpingitis isthimica nodosa (SIN) and endosalpingiosis.

Material and Methods

The present study is a prospective and descriptive study done over a period of two years from October 2012 to September 2014. Entire fallopian tubes which were received either with hysterectomy with unilateral or bilateral salphingoopherectomy, salphingoo-pherectomy or salphingectomy alone were included in the study irrespective of age and clinical diagnosis.

Fallopian tube bits obtained for histopathological examination as a part of family planning procedures were excluded from the study. The samples were adequately fixed for 24-48 hours in 10% formalin. Specimens were subjected to detailed gross examination noting the size, shape, serosal surface, fimbrial end. The tubes were cut and patency of lumen, contents and thickness of wall were noted. If no visible mass is seen (typically in prophylactic salpingoopherectomy) entirely submit the fimbriated end of the fallopian tube to search for carcinoma insitu or small carcinoma as the fimbriated end of the fallopian tube appears to be the most common site for early carcinoma either in BRCA+ or BRCA- patients. Serial longitudinal sections of the fallopian tube fimbria at 2 to 3mm intervals should be done to examine the most surface of the plicae. If visible mass is seen, sections adequate to demonstrate extent of the tumor, including maximal depth of invasion and relationship to surrounding organs / tissues, if present should be taken. Sections showing transition to grossly uninvolved areas of fallopian tube are also helpful [5]. These sections were stained with Hematoxylin and eosin, special stains like PAS were done whenever necessary. Further detailed microscopic examination was done. Factors including age, gravidity, parity, stage, surgical intervention, pathological findings, relapse and survival were analyzed.

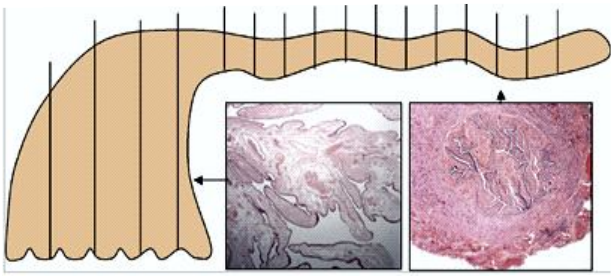

Fig. 1: Protocol for sectioning and extensively examining the fimbriated end(SEE-FIM) of the fallopian tube. The protocol entails amputation and longitudinal sectioning of the infundibulum and fimbrial segment(distal 2cms) to allow maximal exposure of the tubal plicae. The isthmus and ampulla are cut transversely at 2 to 3mm intervals[6].

Results

During the study period a total of 2109 gynecological specimens were received in the department of pathology for histopathological examination. Of these 361 fallopian tubes were included for the study. These 361 fallopian tubes were obtained from 229 patients by various surgical procedures, 86.89%(n=199) patients underwent total abdominal hysterectomy with salphingoophorectomy which were either unilateral or bilateral, 8.29%(n=19) patients underwent salphingoophorectomy and 4.82%(n=11) patients underwent salphingectomy alone.

Bilateral tubes were obtained from 61.57%(n=141) patients and in the remaining 34.43%(n=88) patients only unilateral fallopian tubes were obtained. Age of the patients included in the study ranged from 20 to 69 years. Most of the cases 44.5% (n=102) belonged to 40-49years.Out of 361 fallopian tubes analyzed 50.96%(n=184) tubes showed pathology and 49.04%(n=177) tubes were grossly and microscopically unremarkable(Table 1). 50.96% of fallopian tubes showed pathological lesions and they were distributed as follows (Table 2)

Neoplastic lesions of fallopian tube accounted for

Table 1: Pathological and the normal fallopian tubes

Microscopy	No of tubes (n=361)	Percentage (%)
Pathological	184	50.96%
Unremarkable	177	49.04%
Total	361	100

Table 2: Distribution of various lesions affecting fallopian tubes

Microscopic diagnosis	No of Tubes(n=361)	Incidence %
Unremarkable	177	49.04
Salpingitis	59	16.36
Acute	-06	-1.66
Chronic	-46	-12.76
Foreign body(granulomatous)	-06	-1.67
Tuberculous	-01	-0.27
Hydrosalphinx	32	8.87
Hematosalphinx	19	5.28
Ectopic pregnancy	10	2.78
Paratubal cysts	36	9.99
Walthard cell rests	18	4.98
Salphingitis isthimica nodosa(SIN)	03	0.84
Tumors	O5	1.38
Benign	-00	-00
Malignant	-05	-1.38
Primary fallopian tube carcinom	-01	-0.27
Secondary / Metastasis	-04	-1.11
otal	361	100

1.38%(n=5) of cases, among which no benign tumors were found and all the 5 cases were malignant. Out of which 0.27%(n=1) cases were primary fallopian tube carcinoma and rest 1.11%(n=4) cases were secondary / metastatic tumors.

The patient who presented with primary fallopian tube carcinoma was 48year old with complaints of irregular bleeding per vagina and pain abdomen. This patient was subjected to total hysterectomy with bilateral salphingoopherectomy and the following findings were observed (Figure 2,3,4,5,6).

Of the 361 fallopian tubes studied, 1.11%(n=4) cases showed features of metastasis. Morphologically all were adenocarcinoma. Two patients belonged to 4th decade and and other two patients belonged to 6th decade. Bilateral tubes were affected in one patient and unilateral tube affected in rest of the patients. ovary was the primary site of malignancy in 100% of cases.

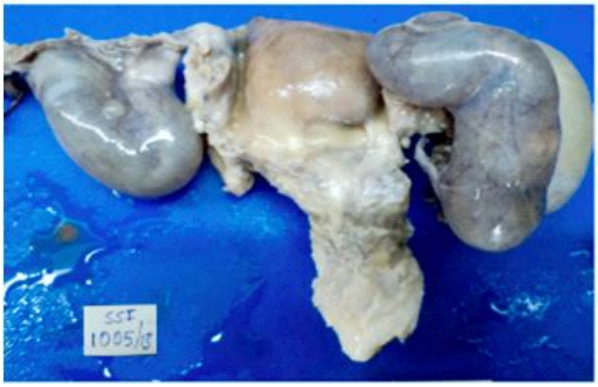

Fig. 2: Gross photograph of uterocervix with bilateral fallopian tubes, affected left fallopian tube m/s 6.8x1.2cms. O/S shows congestion and dilatation

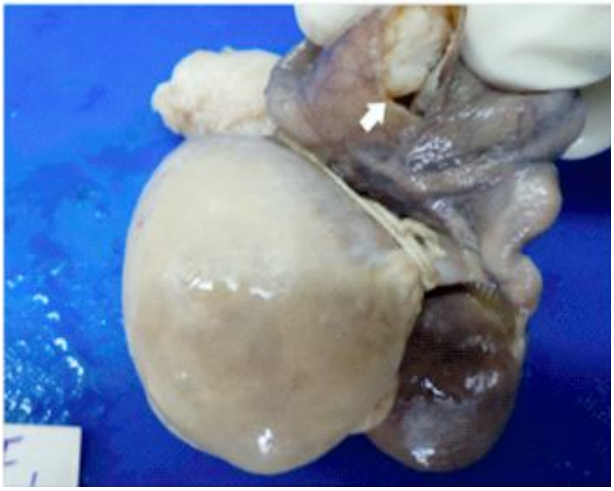

Fig. 3: Left fallopian tube when cut opened showed grey white mass m/s1x1cms obliterating lumen of the fallopian tube

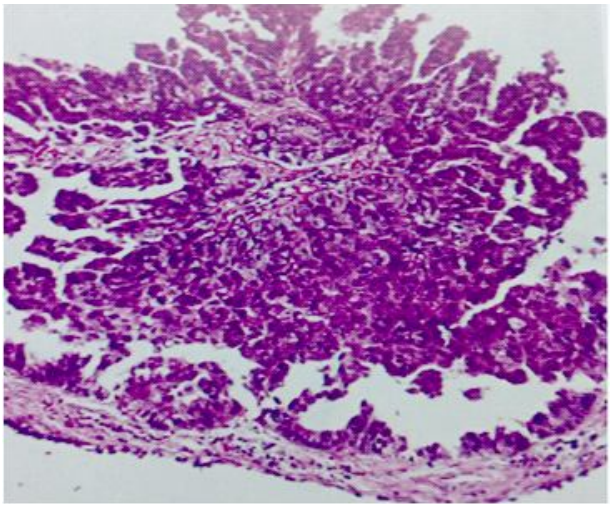

Fig. 4: Microphotograph of PFTC showing tumor cells arranged in complex branching papillae within the fallopian tube lumen.(H&E, 10X)

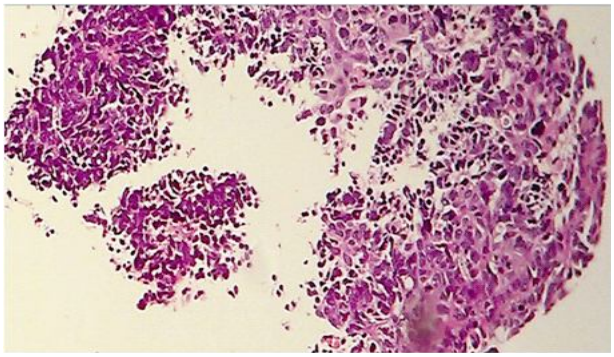

Fig. 5: Microphotograph of metastatic cystadenocarcinoma with tumor cells arranged insheets. These cells show high N/C ratio, nuclear pleomorphism and mitoic figures are seen in tubal lumen and wall. (H&E, 10X)

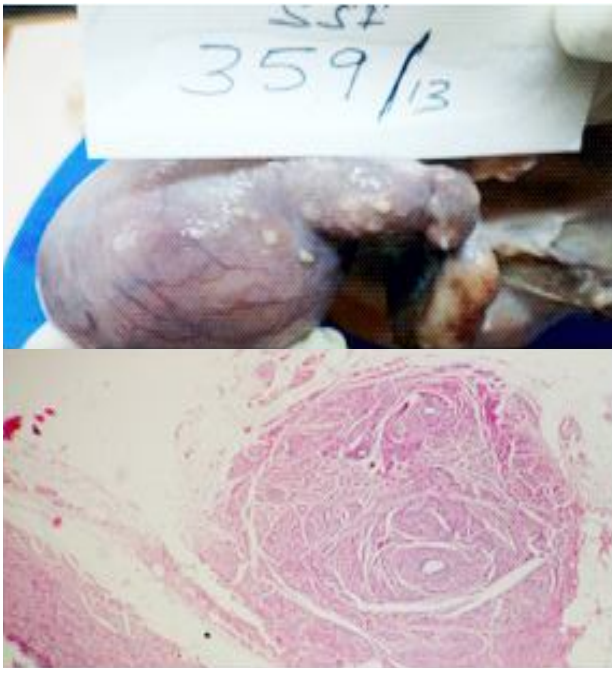

Fig. 6: Gross and microphotograph of Salpingitis isthmica nodosa

Tumor like epithelial lesions included salpingitis isthmica nodosa which accounted for 0.84%(n=3) of cases. They were in 3rd, 5th, 7th decade respectively, grossly tubes showed nodular thickening. Microscopy showed cystically dilated glands surrounded by hypertrophied muscle.

Discussion

In the present study a total of 361 fallopian tubes were received for histopathological examination from various surgical procedures and fallopian tubes received during sterilization procedures were excluded from the study. These 361 fallopian tubes formed 17.11% of the total gynecological specimens. In the present study most common type of surgical procedure done to obtain fallopian tubes was hysterectomy with salphingoophorectomy which is similar to other studies.

Primary tubal neoplasms are rare and are only recognized at surgery or during pathological examination of excised specimen. Longacre et al[7] attributed low incidence of primary malignancy in part due to admittedly arbitrary definitional criteria as it is difficult to distinguish primary tubal carcinoma from primary ovarian/endometrial neoplasms with high stage disease.

PFTC is a very rare malignancy accounts for less than 1% of all gynecological malignancies [8], it is about 0.3% of gynecological cancer. Due to its rarity and difficulty in diagnosis very little is known about it [9]. In the present study of 361 fallopian tubes only one tube showed features of PFTC accounting for 0.27% cases which is comparable to other studies.

Table 3: Comparison of incidence of PFTC in various studies

Study	Number of tubes studied	Number of tubes with PFTC	Percentage
Bagwan et al[10]	687	1	0.15%
Vasanth SS et al[11]	777	2	0.26%
Gon S et al[3]	4762	1	0.02%
Present study	361	1	0.27%

The finding of fallopian tube carcinoma in members of families with BRCA1/BRCA2 germline mutations has suggested an etiological role of these mutations in the development of PFTC and the possibility that this type of carcinoma may be part of hereditary breast-ovarian cancer syndrome [13]. It is important to consider the risk of PFTC when a prophylactic oophorectomy is performed in high risk women. In one study of 26 women with BRCA1/BRCA2 mutations who had undergone prophylactic oophorectomy with salpingectomy, two atypical hyperplasias and two insitu carcinomas were discovered. PFTC is characterized by an extremely unstable phenotype with highly scattered DNA ploidy patterns and frequent P53 gene alterations [14]. The patients are usually diagnosed at an earlier stage due to the shorter history of the symptoms (Latko's triad) and they often present with abdominal pain which is secondary to the tubal distension, intermittent profuse serosanguinous discharge and abdominal masses in 15% of cases [4]. A diagnosis of PFTC is suspected in cases of postmenopausal bleeding or spotting with

negative findings on colposcopy, cervical biopsy, Dand C and abnormal Pap smears. A transvaginal and transabdominal ultrasound can most often detect the solid and cystic components with papillary projections. The diagnosis of PFTC is usually first made by a pathologist during a histopathological examination.

Grossly most PFTC are unilateral(<3% bilateral) and are located in the middle and outer thirds of the fallopian tube. The fimbrial end was involved in 8% of the cases in one large study. PFTC often simulates hydro- or pyo-salpinx particularly if advanced. The fimbriated end of the tube is occluded in approximately 50% of cases. Sectioning reveals single or multiple solid, soft, gray to white friable nodules or polypoidal growth with tumor size varying from 0.2 to 14cms. Extensive hemorrhage and necrosis are often seen [13]. The most common histological types of PFTC are serous, endometrioid,, mixed, undifferentiated, clear cell, transitional and mucinous. The serous and the endometrioid types are more commonly seen [15]. The histological differentiation of the tumor as a prognostic factor is unhelpful. The CA-125 antigen is often expressed by PFTC although per se is not diagnostic for PFTC. CA-125 is early and sensitive marker for the tumor progression during the follow up.

In a study done by Prajna Hariprasad et al [12] clinically and histologically PFTC resembled an EOC(epithelial ovarian carcinoma) and PFTC most frequently occurs between fourth and sixth decade of life with a median age of 55years. It is difficult to diffentiate PFTC from EOC(Epithelial Ovarian Carcinoma). The patient should meet at least one of the following criteria for the diagnosis of PFTC [16] a)The main tumor is in the tube and it arises from the endosalpinx b)Histologically the pattern reproduces the epithelium of the mucosa and it often shows a papillary pattern c)If the wall is involved transition between the benign and the malignant epithelium should be demonstrable d)The ovaries and the endometrium are either uninvolved or they may contain les tumor than that which is there in the tube. Once the fallopian tube origin has been established the most important entity in the differential diagnosis is pseudocarcinomatous hyperplasia which can closely simulate invasive carcinoma. However the degree of cytological atypia is limited, mitotic activity is low or absent without atypical forms and this lesion is frequently associated with salpingitis [13].

Early clinical manifestations and prompt investigations often lead to the diagnosis of PFTC at an early stage than EOC [18]. Surgery is the treatment of choice and it should consist of total abdominal hysterectomy with bilateral salpingoophorectomy, omentectomy and lymph node dissection. In view of the early lymphatic spread the role of the lymph node removal is mandatory in PFTC. PFTC is similar to EOC in the surgical staging and management. More extensive clinical research must be performed in order to have definite aetiologic, diagnostic and management modalities and prognostic markers [19].

Involvement of the fallopian tube by metastasis from a carcinoma of the ovary or endometrium accounts for the majority of tubal malignancies. In the present study there were 1.1%(n=4) cases which showed features of metastasis.

In the present study primary tumor was in the ovary in all cases. Metastatic tumors involving the tube usually are the result of secondary spread from carcinoma of the ovary or endometrium. In most cases the spread is by direct extension. In one study 80% of secondary carcinomas in the tube were of ovarian origin and the remainder originated in the endometrium. Blood borne metastasis from breast carcinomas or other extrapelvic tumors may also occur. The authors are aware of a case of adenocarcinoma of the gall bladder metastatic to the fallopian tube [1]. Regardless of the site of the primary tumor if there is tubal metastasis the prognosis is very poor [17].

Table 4: Comparison of incidence of fallopian tube metastasis in various studies

Study	No of tubes studied	No of tubes with metastasis	Percentage
Bagwan et al[10]	687	2	0.29%
Vasanth S S et al[11]	777	1	0.13%
Gon S et al[3]	4762	5	0.10%
Present study	361	4	1.11%

Tumor like epithelial lesions are proliferations of the tubal mucosa that simulate tubal neoplasms. They include tubal epithelial hyperplasias, salpingitis isthmica nodosa(SIN) and endosalpingiosis. In our study only SIN was recorded and accounted for 0.84%(n=3) of cases. SIN or adenomyosis of the fallopian tube consists of one or more outpouchings / diverticula of tubal epithelium into the muscular wall typically in the isthmic region. The incidence of SIN in healthy, fertile women ranges from 0.6 to 11%. However it is more common in the setting of ectopic pregnancy and infertility. SIN predisposes to higher rate

of primary infertility and ectopic pregnancy. Frequently involves both the fallopian tubes, grossly one / more white nodules are evident on the serosal surface.

Microscopically there is pseudoinfiltrative epithelial growth typically with hyperplasia of the muscular wall. Differential diagnosis of SIN includes follicular salpingitis which consists of small glandular spaces separated by fibrous tissue but not smooth muscle and with prominent lymphoid infiltration. Endometriosis is differentiated by the presence of endometrial type stroma surrounding endometrial glands and tubal carcinoma shows an irregular distribution of the glands, significant cytological atypia and desmoplastic stromal response.

Conclusion

Fallopian tube though being a very rare location for primary or exclusive tumor manifestation. It is now receiving increased attention in gynecological oncology since considerable evidence suggests that distal fallopian tube represents the site of origin of many serous pelvic carcinomas. Hence tubal fimbriae should be completely examined in all the cases in whom fallopian tubes are removed incidentally for benign surgery. Metastatic tumors are much more common than primary fallopian tube tumors. PFTC accounts for less than 1% of female genital tract malignancies. Histologically and clinically it resembles epithelial ovarian carcinoma. The finding of fallopian tube carcinoma in members of families with BRCA1/ BRCA2 germline mutations has suggested the possibility that this type of carcinoma may be part of hereditary breast-ovarian cancer syndrome.

Ethical Clearance

Obtained from ethical committee.

Source of Funding

Self

Conflict of Interest

NIL

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