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Histomorphological Study of Lesions Encountered in Fallopian Tubes: Prospective Study of 361 Cases

Shridevi S.H.*, Jayalaxmi Y.K.*, Chandrashekar M.*, Shashikala P., Deepthi P.****

*Assistant Professor , **Professor, Department of Pathology, Vijayanagara Institute of Medical Sciences, Ballari, Karnataka.

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 lesions of fallopian tubes. *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. Special stains like PAS and modified ZN stain were done wherever necessary. *Results:* Total of 361 fallopian tubes were analyzed, 49.045% (n=177) cases were unremarkable on both gross and microscopic examination. Salphingitis was seen in 16.36% (n=59) cases which includes acute, chronic, tuberculous and foreign body granulomatous salphingitis. Ectopic pregnancy in 2.78%(n=10) cases, endometriosis in 0.58%(n=2) cases, Salphingitis isthimica nodosa in 0.84%(n=3) cases, primary fallopian tube carcinoma in 0.27%(n=1) and metastatic deposits in 1.1%(n=4) 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 and categorized the lesions into various groups. Early and correct diagnosis of these diseases will definitely help clinicians in initiation of prompt therapy against the disease.

Keywords: Fallopian Tubes; Salphingitis; Endometriosis; Salphingitis Isthimica Nodosa.

Introduction

The Italian physician and anatomist Gabriele Falloppio provided the first detailed and accurate description of the oviducts in humans in 1561 A.D and designated it the 'Uteri Tuba'and this organ was eventually named after him. Fallopian tubes are the complex structures that represent more than conduits from ovaries to endometrial cavity [1]. They are the seats of various interactions that culminate in a normally implanted pregnancy. Thus with the exception of a few relatively rare tubal neoplasms which might be life threatening, the significance of pathogenic changes in fallopian tubes is related to the possible effect on fertility [2]. Salphingitis / inflammatory disease of the tube remain responsible for a significant percentage of cases of secondary sterility by occlusion/stenosis [3]. Though histopathology is the gold standard in diagnosing fallopian tube lesions, extensive literature shows a scarcity of such studies. This prompts us to undertake the present study.

Corresponding Author: Chandrashekar M., Assistant Professor, Department of Pathology, Vijayanagara Institute of Medical Sciences (VIMS), Ballari - 583104 Karnataka.
E-mail: drchandrubellary@gmail.com

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, salphingoopherectomy 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. Cysts of fallopian tubes and paraovarian region if present were examined in detail. In case of suspected ectopic pregnancy presence of embryo, placenta, hemorrhage and rupture were noted. Mass when present was evaluated for size, appearance and invasion. Minimum 3 bits were taken from each tube and were routinely processed and sections of 5micron thickness were obtained. These sections were stained with Hematoxylin and eosin, special stains like PAS and modified ZN stains were done whenever necessary. Further detailed microscopic examination was done. Various lesions affecting the fallopian tube were classified as congenital, non neoplastic and neoplastic lesions. Neoplastic lesions were further classified according to WHO classification.

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 184(50.96%) tubes showed pathology and 177(49.04%) tubes were grossly and microscopically unremarkable(Table 1). 50.96% of fallopian tubes showed pathological lesions and they were distributed as follows (Table 2).

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
Salphingitis	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	03	0.84
Tumors	O5	1.38
-Benign	-00	-00
-Malignant	-05	-1.38
Primary adenocarcinoma	-01	-0.27
Secondary / Metastasis	-04	-1.11
Total	361	100

Salphingitis was the commonest histological finding and chronic salphingitis was more common constituting 75% of salphingitis. Chronic salphingitis grossly showed association with fimbrial cysts in 8.69% cases, adhesions to ovary in 8.69% cases,

tubercles in 4.36%cases, tortuous tubes in 2.17% cases. Foreign body granulomatous salphingitis was seen in 1.67% cases and microscopically showed well formed granuloma consisting of epithelioid cells and foreign body type of giant cells with presence of eosinophilic refractile suture material which was birefrigerent on polarized microscopy. Tuberculous salphingitis was seen in only one case accounting for 0.27% cases, grossly tubercles were seen on the external surface and microscopy showed confluent caseating granuloma and ZN staining for AFB was negative.

Ectopic pregnancy was seen in 2.78% (n=10) cases, of these 80% (n=8) were in the 3rd decade and 20% (n=2) were in the 4th decade. In 60% (n=6) cases right fallopian tube was affected and in 40% (n=4) cases left fallopian tube was affected. Grossly 90%(n=9) of tubes showed perforation and 90% of tubes showed blood clot in their lumen and 10% showed hemorrhagic material. One of the fallopian tube had unruptured external surface and on cut section showed intact fetus measuring 4x3cms. Microscopy of these tubes showed presence of chorionic villi, decidual tissue and membranes were seen in one case associated with presence of fetus.

Endometriosis was seen in 0.58% (n=2) cases. One patient was 25years old and the other was 44years, grossly both the cases showed thickened wall and blood clot in their lumen. Microscopically there were endometrial glands and stroma with hemosiderin laden macrophages both in mucosa and the wall.

Hydrosalphinx was seen in 8.87% (n=32) of cases and belonged to varied age group. Grossly tubes were dilated filled with serous fluid and microscopically tubal epithelium was flattened with loss of plicae.

Hematosalphinx was seen in 38.88% (n=7) cases, grossly tubes were dilated and filled with hemorrhagic material and blood clot. On microscopy there is flattening of the epithelium with loss of plicae, congested blood vessels and hemosiderin laden macrophages in the wall.

Salphingitis isthimica nodosa was seen in 0.84% (n=3) cases. They were in 3rd, 5th, 7th decade respectively, grossly tubes showed nodular thickening. Microscopy showed cystically dilated glands surrounded by hypertrophied muscle.

Walthard cell nests were seen in 4.98%(n=18) cases. They belonged to varied age group, grossly 55.55% tubes showed structures resembling tubercles on the serosal surface. Microscopically there was island of transitional cells in the wall just beneath the serosa in all the cases and one tube showed cystic change.

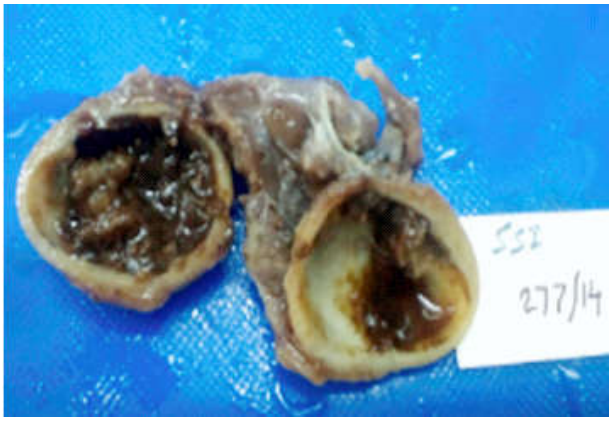

Fig. 1: Gross photograph of tuberculous salphingitis showing dilated lumen filled with necrotic material

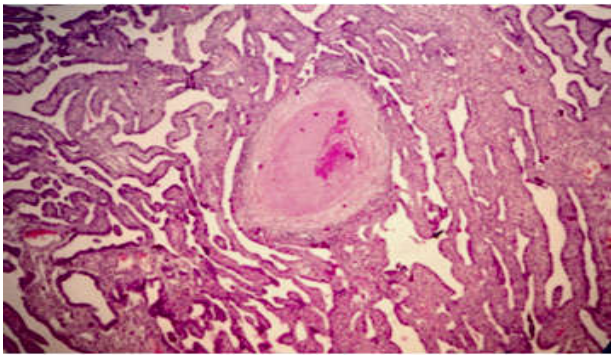

Fig. 2: Microphotograph of tuberculous salphingitis showing granuloma with central caseous necrosis

Fig. 3: Gross photograph of tubal ectopic pregnancy with intact fetus

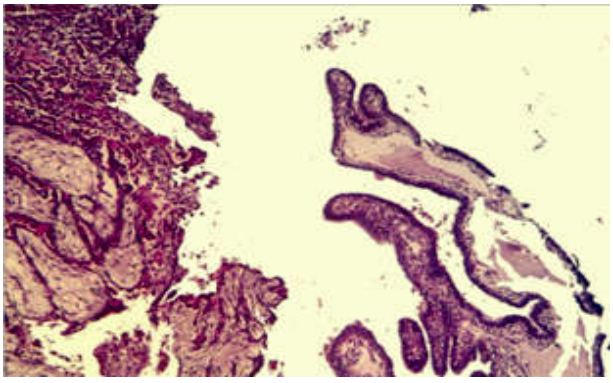

Fig. 4: Microphotograph of ectopic pregnancy showing chorionic villi. (H&E)

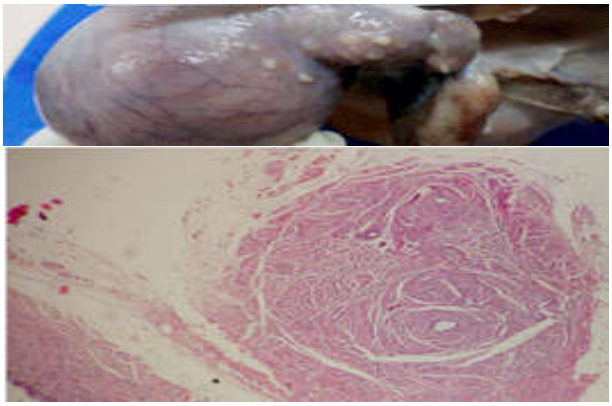

Fig. 5: Gross and microphotograph of Salpingitis isthmica nodosa

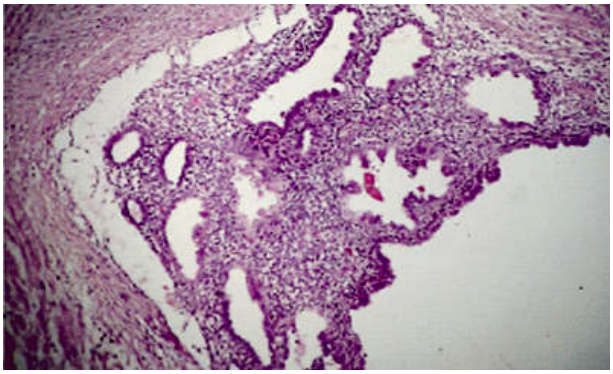

Fig. 6: Microphotograph of tubal endometriosis showing endometrial glands and stroma in the tubal wall. (H&E)

Table 3: Comparison of type of surgical procedures done in various studies

Studies	Sample size	Study period	Hysterecomy with salphingoophorectomy	Salphingo ophorectomy	Salphingectomy
Bagwan IN et al[2]	687	3	326(72.77%)	103(22.99%)	14(3.13%)
Vasanth SS et al[4]	777	2	465(91.53%)	18(3.54%)	25(4.93%)
Gon S et al[5]	4762	5	1960(76.11%)	151(5.86%)	376(14.60%)
Present study	361	2	199(86%)	19(8.29%)	11(4.82%)

Table 4: Comparison of pathological and non pathological fallopian tubes in various studies

Studies	Unremarkable tubes	Tubes with pathology
Bagwan IN et al [2]	66.52%(n=457)	33.48%(n=230)
Vasanth et al[4]	50.16%(n=390)	49.81%(n=387)
Gon S et al[5]	69%(n=1777)	31%(n=798)
Satish et al[6]	58.06%(n=360)	41.93%(n=260)
Present study	177% (49.04%)	50.96%(n=184)

Salpingitis constituted the major bulk of tubal pathology accounting for 16.36%(n=59) cases.

Table 5: Comparison of incidence of salphingitis and its subtypes in various studies

	Bagwan IN et al[2]	Gon S et al[5]	Jaynisha et al [7]	Present study
Salphingitis	18.05%	6.84%	8.29%	16.36%(n=59)
-Acute salphingitis	2.62%	0.31%	2.57%	1.66((n=06)
-Chronic salphingitis	4.22%	6.46%	5.4%	12.76%(n=46)
-Granulomatous salphingitis	2.2%	1.9%	0.29%	1.67%(n=06)

Fimbrial cysts / Cysts of Morgagni were seen in 9.88% (n=36) cases and belonged to varied age group. Grossly cysts ranged from .2 to 2.4 cms with transparent wall and clear fluid. These cysts are lined by cuboidal to flattened epithelium. These fimbrial cysts were associated with chronic salphingitis in 16.6% cases, walthard cell rests in 19.44% cases and hematosalphinx in 2.77%cases.

Neoplastic lesions of fallopian tube includes primary adenocarcinoma accounting for 0.27% (n=1) cases, metastatic serous cystadenocarcinoma accounting for 1.10%(n=4) of cases. Patients belonged to varied age group ranging from 30-69years.

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.

Majority of the patients 68.99%(n=158) belonged to age group 30-49years, this is similar in the study done by Gon S et al where majority of patients 46.25% belonged to age group 36-45years.

This variation in prevalence of infections is attributed to various factors like awareness of genital infections, attitudes to sexual relationships, treatment,

type of antibiotics and various other factors [8].

The incidence of acute salphingitis which correlates clinically with pelvic inflammatory disease is highest in sexually active women aged 15-24 years and risk factors include sexual behavior, instrumentation and intrauterine device. The most common organisms associated are Neissseria gonorrhea, Chlamydia, Mycoplasma. Complications of acute salphingitis include peritonitis, abscess and subsequent infertility. Chronic salphingitis typically occurs following one or more episodes of acute salphingitis and clinically manifests as pelvic pain or infertility. Differential diagnosis includes florid reactive epithelial changes associated with inflammation should be distinguished from insitu or invasive carcinoma [9]. Granulomatous salphingitis comprise a group of disorders characterized by presence of granulomas in the mucosa or wall of the fallopian tubes and clinical symptoms overlap with that of chronic salphingitis. Identification of granulomas requires further studies to determine the precise etiology as either infectious like tuberculosis, rarely actinomycosis, parasites like Eenterobius vermicularis and schistosomiasis or non infectious like sarcoidosis, Crohn's disease or reaction to foreign body. Infertility and increased chance of ectopic pregnancy are the most important long term complications of salphingitis. The rate of infertility is approximately 15% after a first episode of salhingitis and increases to 50% after a third episode [10,11]. Infertility was observed in association with acute, chronic and tuberculosis salphingitis highlighting the possible role of inflammatory pathology in causing tubal block and hence infertility, Urman et al[12] share the similar experience. Agarwal et al [13]did a clinicopathological study of female genital tuberculosis and found the incidence declining from 1.8% in 1974 to 0.8% in 1989 onwards. Present study showed 0.27% (n=1) cases of tuberculosis, this is comparable with study done by Gon et al (0.10%) and Bagwan et al (1.60%).

Ectopic gestation of fallopian was seen in 2.78%(n=10) cases which is similar to the study done by Vasanth et al [4] which showed 3.24% cases and majority of the patients were in 2nd decade which is similar to study done by Pauersten CJ et al [14] and Fox H et al [15]. In present study right fallopian tube was commonly involved and external surface showed perforation in 90% cases this is in coordinance with study done by Brenner PF et al [16]. The differential diagnosis includes a distended blood filled fallopian tube may clinically and grossly simulate a tumor, fallopian tube torsion with hemorrhagic infarction or endometriotic mass, all of which are readily diagnosed on microscopic examination [9].

Tubal endometriosis is rare and usually found incidentally during microscopic examination. In the present study it was seen in 0.58% (n=2) cases which was comparable to the study done by Jenkins S et al [17] (1.6%), Bagwan IN et al (0.15%). In younger women the main impact of tubal endometriosis is on fertility with the rate of successful pregnancy diminished on the extent of tubal occlusion. Similar to its natural history at other sites patients with endometriosis have an increased risk for subsequent malignancy. The differential diagnosis includes Salphingitis isthimica nodosa, Endosalpingosis and endometrioid adenocarcinoma [9].

Tumors of the fallopian tube are much less common than the corresponding ovarian neoplasms, however histologically the same surface epithelial-stromal tumor subtypes are recognized. Fallopian tube carcinomas are a component of the hereditary breast-ovarian cancer syndrome caused by BRCA1 and BRCA2 germline mutations. Primary fallopian tube adenocarcinoma accounts for 1% of all female genital tract malignancies [17]. Longacre et al [18] 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. It is essential for the pathologist to section the fallopian tube serially and submit all the tissue for microscopic examination so that the diagnosis of carcinoma is not missed [19]. In the present study incidence of primary fallopian tube adenocarcinoma was 0.27%(n=1) cases which is comparable with the study done by Gon S et al (0.02%) and Bagwan S et al (0.15%).

However metastatic tumors were seen in 1.11% (n=4) cases and ovary was the primary site of malignancy in 90% of cases.Metastasis to the tube usually come from ovary followed by endometrium and cervix. Regardless of the site of primary tumor if there is tubal metastasis the prognosis is very poor [20].

Conclusion

Fallopian tube is one of the common specimens received for histopathology; it has traditionally played a minor role in diagnostic pathology. Although nearly 50% of the fallopian tubes were unremarkable in the present study, the specimen must be subjected to detailed examination to identify the pathological lesions such as ectopic pregnancy, adenomatoid tumors and tubal malignancies. It is essential to have proper knowledge of various lesions of the fallopian tube as well as recent concept of distal fallopian tube

as a new model for pelvic serous carcinogenesis.

Ethical Clearance

Obtained from ethical committee.

References

1. Anderson MC. The fallopian tube. In:Symmers WSTC ed. Systemic pathology: Female Reproductive System. Churchill livingstone:London;1991.p 241-261.
2. Bagwan JN, Harke AB, Malpani MR, Deshmukh SD. Histopathological study of spectrum of lesions encountered in the fallopian tube. J Obstet Gynecol Ind 2004; 54(4):379-82.
3. Gompel C, Silverberg SG. Pathology in Gynecology and obstetrics, 3rd ed.Philadelphia:JB Lippincott company, 1985; 278-305.
4. Vasanth SS. Histomorphological study of surgically removed fallopian tubes. (Unpublished Doctoral Dissertation, RGUHS, Karnataka, 2006.
5. Gon S, Basu A, Majumdar B, Das TK, Sengupta M, Ghosh D. Spectrum of histopathological lesions in the fallopian tube. J Pathol Nepal 2013; 3:356-60.
6. Satish KV, Sreenivasulu K, Janaki M, Harish V, Raja V. Study of histomorphological lesions of fallopian tubes. J of Evolution of Med and Dent Sci 2015; 4(40):6938-43.
7. Jaynisha P, Rekha RI. Spectrum of histopathological changes in fallopian tubes – a study of 350 cases. International Journal of scientific research 2016; 5(1):180-82.
8. Westrom L. Incidence, prevalence and trends of acute pelvic inflammatory disease nd its consequences in industrialized countries. Am J Obstet Gynecol 1980; 138:880-92.
9. Cabrero IA. Pathology of the fallopian tube and broad ligament. In Goldblum JR editor. Gynecological pathology; 2009. p.331-64 .
10. Harrison BM, Christenson J, Harrison A, Matlak M. Group A streptococcal salpingitis in a prepubertal girl. Clin Pediatr 1995; 34:556-8.
11. Algren S, Strickland J. Beta hemolytic streptococcus Group F causing pelvic inflammatory disease in a 14 year old girl. J Pediatr Adolesc Gynecol 2005; 18:117-9.
12. Urman B, Gomel V, Mccomb P et al. Midtubal occlusion: etiology, management and outcome. Fertil Steril 1992; 57:747-50.
13. Agarwal J, Gupta JK. Female genital tuberculosis – a retrospective clinicopathological study of 501 cases. Indian J Pathol Microbiol 1993; 36(4):389-97.
14. Pauersten CJ, Croxalto HB, Eddy C, Ramey I, Walters MD. Anatomy and pathology of tubal pregnancy. J Obstet Gynecol 1986; 67(3):301-8.
15. Fox H. Ectopic pregnancy. In:Fox H editor. Haines and Taylor Obstetrical and Gynecological pathology 5th ed. New York: Churchill Livingstone; 2003. p1113-1136.
16. Brenner PF, Roy S, Mishell DR. Ectopic pregnancy a study of 300 cconsecutive surgically treated cases. JAMA 1980; 24(7):673-6.
17. Ajithkumar TV, Minimole AL, John MM, Ashok kumar OS. Primary fallopian tube carcinoma. Obstet Gynecol Sury 2005; 60:247-52.
18. Longacre TV, Oliva E, Soslow RA. Association of directors of anatomic and surgical pathology. Recommendations for the reporting of fallopian tube neoplasms. Hum Pathol 2007; 38:1160-3.
19. Colgan PJ. Challenges in the early diagnosis and staging of fallopian tube carcinoms associated with BRCA mutations. Int J Gynecol Pathol 2003;22:09-20.
20. Hunt J, Lynn A. Histologic features of surgically removed fallopian tubes. Arch of Pathand Lab Med 2002; 126:951-5.