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ORIGINAL ARTICLE

Histopathological Findings in Corresponding Salpingectomy Specimens of Various Ovarian Neoplasms

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ABSTRACT

Aim: The aim of this study is to evaluate salpingectomy specimens of all types of ovarian tumors by opting SEE-FIM grossing protocol.

Methods: A total of 79 samples of fallopian tubes were grossed following SEE-FIM protocol, as mentioned by CAP. This study was conducted in Pathology department at Niazi Medical and Dental College Sargodha.

Results: One third ovarian tumors (n = 26, 33.8%) were bilateral and two fifth tumors (n = 31, 40.3%) were on the right side. More than ninety percent samples (n = 71, 92.2%) had non-precursor lesions. Lastly, most common cases of ovarian tumors were of mature cystic teratoma (n = 16, 20.8%), dysgerminoma (n = 13, 16.9%) and mucinous cystadenoma (n = 12, 15.6%). The results of chi-square tests showed significant association of both histopathological changes in fallopian tube (χ^2 (6) = 31.05, $p < .001$) and histopathological findings (χ^2 (2) = 7.81, $p < .05$) with types of ovarian neoplasm.

Conclusion: The routine following of SEE-FIM is an easily adoptable and valuable protocol in terms of finding unexpected / incidental lesions and their correlation with different ovarian neoplasms.

Keyword: SEE-FIM protocol, Salpingectomy specimen, precursor fallopian tube lesions.

INTRODUCTION

For a long time, nobody paid much attention to the fallopian tube when it came to histopathology. Metaplasia, inflammation, hydro-salpinx, ectopic tubal pregnancy, and tumours are among the few non-neoplastic disorders that can manifest as visible lesions in the fallopian tube[1] A comprehensive bilateral examination of the fallopian tubes is necessary for diagnosing uterine and extra-uterine serous cancers. The treatment methods vary based on the primary tumor's location. Different strategies are used to treat ovarian cancers that develop from preexisting fallopian tube lesions and those that develop from scratch[2,3]

Ovarian cancer affects around one fourth of all the women diagnosed with cancer every year. The average 5-year survival rate is between 30% and 50%. More than 15000 women in the United States will be losing their lives courtesy to ovarian cancer every year[4]. There is no foolproof way to prevent the disease and the vast majority of cases are not identified until a late stage. The presence of premalignant cells in the fallopian tube epithelium has been proposed as a mechanism for the development of ovarian cancer. The fallopian tube may be the site of origin for both high- and low-grade serous carcinomas of the ovary. The gynaecologists' understanding of the fallopian tube's significance in the onset of epithelial ovarian cancer has been heightened as a result.[5]

Ironically, the large number of females in whom the ovarian cancer is detected, were having advanced disease at the time of their diagnosis. This includes women whose cancer is the most frequent subtype, high-grade serous carcinoma (HGSC). This could be attributable to the absence of efficient screening techniques for the early diagnosis of ovarian cancer in high-risk individuals as well as general populations[6]

Ovarian, fallopian tube, and breast cancer chances are all thought to go down after a prophylactic bilateral salpingectomy (PBS). Nonetheless, there are still many open questions, such as those pertaining to the optimal time for the treatment, the prevalence of non-oncologic morbidity, and the security of menopausal hormone therapy[7]. Precursor lesions originating in fallopian tube are not always grossly visible, and the proven method of sampling for identifying these lesions is Sectioning and Extensively Examining the Fimbriated End (SEE-FIM). This grossing protocol helps in exploring fallopian tube in an elaborative manner and is mandatory in neoplasms of serous origin. According to studies, serous tubal intraepithelial carcinoma (STIC) of the fallopian tube is a likely precursor of ovarian and peritoneal serous carcinoma. It has been suggested that resected fallopian tube tissues be thoroughly screened for STIC, particularly in women with a high risk of serous carcinoma, such as those with BRCA mutations or a strong family history. The SEE-FIM methodology permits the maximum surface area of the tube to be evaluated histologically. There have been recommendations that if the initial hematoxylin and eosin (H&E) sections are negative, additional deeper slices must be studied and evaluated[8].

In the following study this grossing protocol has been adopted in salpingectomy specimens of all types of ovarian tumors. It will provide additional information in regards to different pathologies involving fallopian tube of corresponding ovary tumor. The purpose of this study was to study salpingectomy specimens of all types of ovarian tumors by opting SEE-FIM grossing protocol.

MATERIAL AND METHODS

A total of 79 samples of fallopian tubes were grossed following SEE-FIM protocol as it allows the optimal histological evaluation. This study was conducted in Pathology department at Niazi Medical and Dental College Sargodha, over a period of two years. All female patients of all age groups having ovarian neoplasms admitted in the hospital and had bilateral salpingectomy and specimens with definite unilateral or bilateral ovarian tumors seen were enrolled in the study.

Unilateral salpingectomy specimens and specimen with ovaries pathologies other than neoplasms, salpingectomy specimens done for tubal ectopic pregnancy, Salpingectomy without oophorectomy, specimen done as a part of either staging purposes or due to any other non-neoplastic reasons, were not included.

According to the technique, the terminal 2 cm (fimbrial end) of the oviducts was severed from the remainder of the fallopian tubes and longitudinally dissected. The remaining tube was chopped into 2-3 mm cross pieces (bread loafed). The complete material was sent in for analysis. Because in situ/early malignant epithelial lesions were most commonly detected in the fimbriae, this specific procedure of sampling guaranteed that the exterior epithelium of the fimbria was widely accessible. To reach at the conclusions, all of the slices were dyed with Haematoxylin and Eosin, and the images were examined by three of the experts.

Serous tubal intraepithelial carcinoma (STIC) is characterized as the localized replacing of physiological fallopian tube mucosa by cancerous cell. A pre-configured questionnaire was used to obtain the medical background of the cases. The

sample was grossed, and the dimensions, surface, cross-sectional surface, and components were all documented. For microscopic investigation, three microstructures were collected from each fallopian tube in the proximal, mid, and distal parts. For greater coverage, the proximal region was sequentially cross sectioned at 2-3 mm intervals, and the fimbriated end was longitudinally sectioned. The sections were normally processed; H&E stained, and microscopic results were examined. The collected data were statistically evaluated in IBM SPSS software version 20.0 for Windows utilizing frequency and cross tabulation processes.

RESULTS

The results of the current study showed that one third ovarian tumors (n = 26, 33.8%) were bilateral and two fifth tumors (n = 31, 40.3%) were on the right side. More than ninety percent samples (n = 71, 92.2%) had non-precursor lesions. Lastly, most common cases of ovarian tumors were of mature cystic teratoma (n = 16, 20.8%), dysgerminoma (n = 13, 16.9%) and mucinous cystadenoma (n = 12, 15.6%).

Table 1: Frequency Table showing Characteristics of Ovarian Neoplasms

Characteristics	n (%)	
Laterality		
Left	20	(26.0)
Right	31	(40.3)
Bilateral	26	(33.8)
Lesions Origin		
Precursor	6	(7.8)
Non-precursor	71	(92.2)
Ovarian Tumor Pathology		
Adult Granulosa Cell Tumor	5	(6.5)
Dysgerminoma	13	(16.9)
Endometrioid Carcinoma	3	(3.9)
Fibroma	3	(3.9)
Juvenile Granulosa Cell Tumor	1	(1.3)
Malignant Brenner Tumor	3	(3.9)
Mature Cystic Teratoma	16	(20.8)
Mixed Germ cell Tumor	3	(3.9)
Mixed Mullerian Tumor	1	(1.3)
Mucinous Cystadenocarcinoma	2	(2.6)
Mucinous Cystadenoma	12	(15.6)
Serous Cystadenocarcinoma	2	(2.6)
Serous Cystadenofibroma	1	(1.3)
Serous Cystadenoma	8 (10.4)	
Serous Papillary Carcinoma	2	(2.6)
Thecoma	2	(2.6)
Note. n = 77 Female Patients with Ovarian Neoplasms		

The results of cross-tabulation showed that majority of benign tumors had mucinous metaplasia and non-specific hyperplasia in fallopian tube while most common histopathological change found in fallopian tube of cases having malignant neoplasms was papillary tubal hyperplasia. All the cases having endometriosis, serous tubal intraepithelial carcinoma and transitional tubal metaplasia in fallopian tube were of malignant neoplasms.

The histopathological findings revealed that out of forty four cases, twenty six ovarian tumors were benign having hyperplasia in fallopian tube. Out of twenty seven metaplasia cases, more than half (n = 16) cases were of benign tumors while all the cases having precursor lesions were of malignant neoplasms.

The results of chi-square tests showed significant association of both histopathological changes in fallopian tube (χ^2 (6) = 31.05, $p < .001$) and histopathological findings (χ^2 (2) = 7.81, $p < .05$) with types of ovarian neoplasm. Only six cases were found to have precursor lesions out of which four had serous tubal intraepithelial carcinoma and two cases had endometriosis in fallopian tube.

DISCUSSION

Prevention of ovarian cancer and diagnosis at an earlier stage of the disease continue to be the most important aspects of its therapy, particularly for high-grade serous carcinoma. Ovarian cancer is the largest cause of mortality from gynecologic cancer in the globe (HGSC). The hereditary germ cell sarcoma derives from serous tubal intraepithelial cancer that develops in fallopian tube secretory cells, as supported by an accumulating body of epidemiological and molecular evidence[9]. Essential events for serous carcinogenesis have been revealed by comprehensive molecular analysis and mice experiments, giving novel molecular targets. It has been suggested that high-risk patients who carry BRCA mutations could benefit from a procedure called risk-reducing bilateral salpingo-oophorectomy (RRSO), which removes both the ovaries and the fallopian tubes[10].

Although surface epithelial cancers frequently arise in the ovaries, no ovarian tissue-based precursor lesions have yet been discovered. Precursor lesions, specifically serous tubal intraepithelial carcinoma, were found in the fimbrial end of the fallopian tube after analysing specimens from high-risk women who had had salpingo-oophorectomy (STIC). Based on this finding, the SEE-FIM procedure was developed to enhance the fimbrial surface area accessible for evaluation and, in turn, the likelihood of discovering the precursor lesions[11].

Because the SEE-FIM procedure makes it easier to identify lesions that cannot be differentiated using traditional sampling protocols, this leads to more accurate tumor staging and a deeper comprehension of the processes that lead to the development of cancer. Laokulrath N, et al. established that the SEE-FIM approach was beneficial, particularly in cases where there was a significant chance of concurrent fallopian tube cancer. The SEE-FIM methodology was used to analyze fallopian tubes from 450 women who had undergone risk-reducing salpingo-oophorectomy or had been diagnosed with a malignancy of the ovary, endometrium, fallopian tube, or peritoneum. Twenty-five out of seventy cases of pelvic extra-uterine HGSC, one case of endometrioid carcinoma, and four cases of uterine serous carcinoma were found to be HGSC originating in the tubal cervix.[12]

SEE-FIM was used to analyze 60 ovarian tumour samples from hysterectomies with bilateral salpingo-oophorectomies. We employed non-tumorous specimens as a control group. The fallopian tube's histological abnormalities were classified as tubal intraepithelial carcinoma TIC, tubal intraepithelial lesion TIL. 10% of the study group (6/60) had TIC, 38% had TIL, 23% showed stratification changes, and the rest were negative. 7 of the 60 cases were high-grade serous carcinomas, and 5 had TIC changes (71.43%). None of the 60 control cases showed TIC changes, while 6.66% (4/60) showed TIL and 26.6% (16/60) had stratification changes. SEE-FIM detects ovarian epithelial tumour precancerous lesions by evaluating the fimbrial end.[6]

When utilizing the traditional method, it is possible to miss lesions that are benign, premalignant, or even malignant. In particular situations, such as endometrial carcinoma, nonuterine pelvic serous malignancies, or serous borderline ovarian tumours, the SEE-FIM regimen is highly recommended to be investigated. In the case of other lesions, at the very least, a careful inspection of the tip of the fimbria ought to be performed.

It was done with a smaller sample size and at only one institution. Moreover findings were not compared with normal control group. But it can be one of the pioneer studies in our local setting which utilized SEE-FIM protocol.

CONCLUSION

To summarise, we found that the fallopian tubes were unusual in the larger percentage of serous and seromucinous neoplasms, as well as a smaller number of serous/seromucinous borderline tumours, giving additional proof for directly involving the tubes in their pathogenesis and progression, despite the fact that just a few instances of the seromucinous classification have been seen. Some mucinous, endometrioid, and clear-cell carcinomas also have infiltrationin their tubes. Almost 1% of "normal" tubes have an intraepithelial cancer. Furthermore, transitory metaplasia of the fimbrial end is a rather common lesion that should not be mistaken with STIC.

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