Research Article

Analysis of utility of frozen section in ovarian cancers

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ABSTRACT

Introduction: Ovarian tumors constitute a heterogeneous group of lesions which include benign, borderline and malignant tumors. A diagnostic tool which helps to identify various ovarian lesions with high degree of accuracy will help the surgeon to choose appropriate operating procedure. **Aims and objectives:** The basic aim of the study is to analyze the utility of frozen section in ovarian cancers. **Material and methods:** This cross sectional study was conducted in Yusra General Hospital during March 2018 to December 2018. This study was conducted with the permission of ethical committee of hospital. The following parameters were noted-age of the patient, size of the tumor, unilateral/bilateral, solid/cystic/solid and cystic. After gross examination, two to five sections were taken depending on the size and heterogeneity of the lesions. Sections of 4–5 microns were taken and rapid hematoxylin and eosin staining was done. After the frozen section analysis tissues were put in formalin and routine processing was done. **Results:** The data were collected from 237 ovarian cancer patients. The age group ranged from 14 to 86 years and the mean age was 46 years. The mean size of the tumors was 14 cm and ranged from 3 to 36 cm. In 29 cases, the lesions were bilateral. The distribution of various ovarian lesions according to permanent section result were as follows–27 nonneoplastic lesions, 153 epithelial tumors, 16 sex cord stromal tumors, 30 germ cell tumors and seven metastatic tumors. **Conclusion:** It is concluded that diagnostic accuracy rate for frozen section analysis is high for benign and malignant ovarian tumors, but remain relatively low for borderline ovarian tumors.

Kew words: Tumor, Ovarian, Cancer, Frozen

INTRODUCTION

Ovarian tumors constitute a heterogeneous group of lesions which include benign, borderline and malignant tumors. A diagnostic tool which helps to identify various ovarian lesions with high degree of accuracy will help the surgeon to choose appropriate operating procedure. Preoperative diagnostic modalities include serum tumor marker level estimation and imaging [1]. The serum tumor marker- CA 125 is not specific. Women with suspected early-stage ovarian cancer need surgical staging which involves taking samples from areas within the abdominal cavity and retroperitoneal lymph nodes in order to inform further treatment [2]. One potential strategy is to surgically stage all women with suspicious ovarian masses, without any histological information during surgery. This avoids incomplete staging, but puts more women at risk of potential surgical over-treatment [3].

A second strategy is to perform a two-stage procedure to remove the pelvic mass and subject it to paraffin sectioning, which involves formal

tissue fixing with formalin and paraffin embedding, prior to ultrathin sectioning and multiple site sampling of the tumor [4]. Surgeons may then base further surgical staging on this histology, reducing the rate of over-treatment, but conferring additional surgical and anaesthetic morbidity [5].

A third strategy is to perform a rapid histological analysis on the ovarian mass during surgery, known as 'frozen section' [6]. Tissues are snap frozen to allow fine tissue sections to be cut and basic histochemical staining to be performed. Surgeons can perform or avoid the full surgical staging procedure depending on the results [7]. However, this is a relatively crude test compared to paraffin sections, which take many hours to perform. With frozen section there is therefore a risk of misdiagnosing malignancy and under staging women subsequently found to have a presumed early-stage malignancy (false negative), or over staging women without a malignancy (false positive) [8].

Aims and objectives
The basic aim of the study is to analyze the utility of frozen section in ovarian cancers.

MATERIAL AND METHODS
This cross sectional study was conducted in Yusra General Hospital during March 2018 to December 2018. This study was conducted with the permission of ethical committee of hospital. The following parameters were noted-age of the patient, size of the tumor, unilateral/bilateral, solid/cystic/solid and cystic.

Biochemical analysis

After gross examination, two to five sections were taken depending on the size and heterogeneity of the lesions. Sections of 4–5 microns were taken and rapid hematoxylin and eosin staining was done. After the frozen section analysis tissues were put in formalin and routine processing was done. The results of frozen section diagnosis were compared with the permanent section diagnosis. The lesions included non-neoplastic and neoplastic entities. The neoplastic lesions were categorized into benign, borderline and malignant. The neoplastic lesions included epithelial tumors, germ cell tumors, sex cord stromal tumors and metastatic tumors. The cases which underwent torsion with extensive hemorrhage and infarction were excluded from the study. Overall accuracy was defined as the percentage of concordance between frozen and final diagnosis.

Statistical analysis
The sensitivity, specificity, positive predictive value and negative predictive value in diagnosing each category were calculated. The cases with diagnostic discrepancies were reviewed and the possible causes of diagnostic errors analyzed.

RESULTS
The data were collected from 237 ovarian cancer patients. The age group ranged from 14 to 86 years and the mean age was 46 years. The mean size of the tumors was 14 cm and ranged from 3 to 36 cm. In 29 cases, the lesions were bilateral. The distribution of various ovarian lesions according to permanent section result were as follows–27 nonneoplastic lesions, 153 epithelial tumors, 16 sex cord stromal tumors, 30 germ cell tumors and seven metastatic tumors.

Table 1: Histological types according to permanent section results

Histopathology Diagnosis	Number	Percentage
Non-neoplastic lesions	27	11.58
Epithelial tumors	153	65.67
Sex cord stromal tumors	16	6.9
Germ cell tumors	30	12.87
Metastasis	7	3

The sensitivity, specificity, positive predictive value and negative predictive value of each category were calculated.
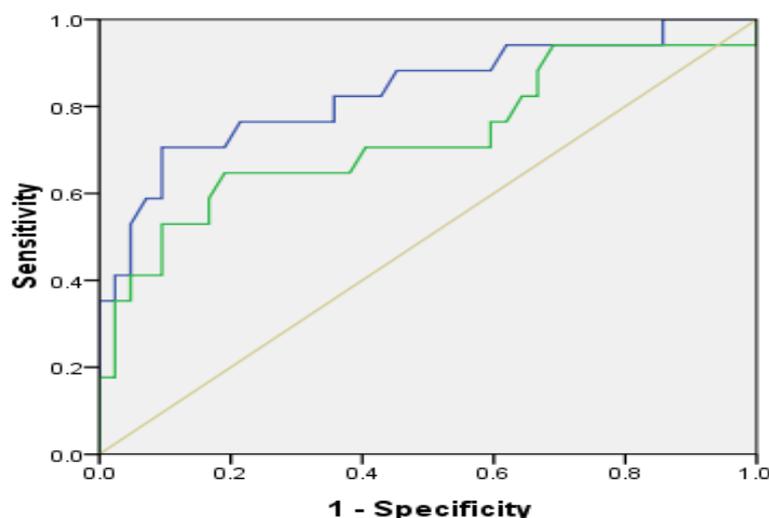
**Figure 01:** ROC curve of specificity and sensitivity

Table 2: Sensitivity, Specificity, PPV[a] and NPV[b] of Frozen section diagnoses

	Benign	Borderline	Malignant
Sensitivity	99.2 %	88.46 %	82.95 %
Specificity	96.5 %	93.23 %	99.3 %
PPV[a]	96.72 %	62.16 %	98.65 %
NPV[b]	99.1 %	98.47 %	90.57 %

[a] *PPV* positive predictive value
[b] *NPV* negative predictive value

Frozen section examination showed cells arranged in glandular pattern with focal increased cellularity and minimal atypia. The stroma showed focal fibrosis.
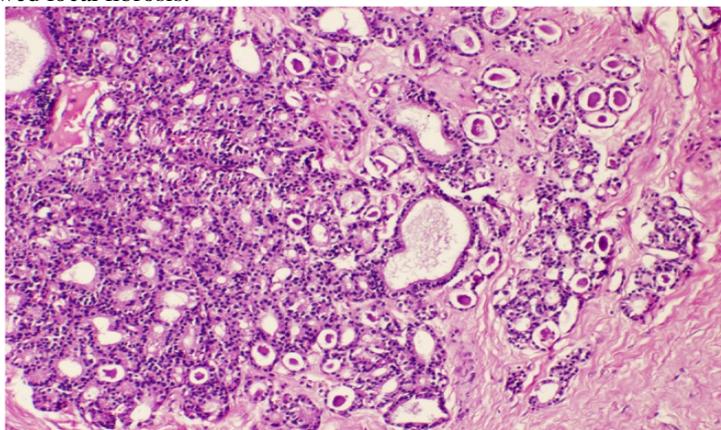
Frozen section of ovarian cells

DISCUSSION

Frozen section examination can diagnose the benign conditions with a high degree of accuracy. Out of 122 cases reported as benign on frozen section analysis, diagnostic discrepancy occurred in four cases [9]. In three cases there were focal borderline areas in addition to the predominant benign component. One case showed a combination of benign, borderline and focal low grade invasive carcinoma. The sensitivity, specificity, positive predictive value and negative predictive value of frozen section in diagnosing benign conditions in this study were 99.2, 96.5, 96.72 and 99.1 % respectively [10].

Borderline ovarian tumors constitute 10–20 % of all ovarian malignancies. The borderline ovarian tumors usually occur in younger age group and

the long term prognosis is significantly better. The accurate diagnosis is critical to avoid overtreatment or undertreatment. The diagnosis of borderline ovarian tumor in older age group will lead the surgeon to do hysterectomy, bilateral salpingo-oopherectomy and surgical staging [8]. With the same diagnosis in reproductive age group, where the incidence of borderline tumors are high, the surgical management is fertility conserving surgery-unilateral salpingo-oopherectomy or even cystectomy with surgical staging [11].

Diagnostic discrepancy was greater in cases of serous tumors with a borderline diagnosis on frozen section. Among the eight false negative serous tumors, five showed borderline serous tumor with foci of invasive carcinoma. This highlights a major limitation of frozen section examination. Around 20 % of serous tumors may contain small foci of low grade serous carcinoma which may not be picked up in frozen section examination [12]. The small foci of carcinoma could escape the limited sampling during frozen section examination [13].

CONCLUSION

It is concluded that diagnostic accuracy rate for frozen section analysis is high for benign and malignant ovarian tumors, but remain relatively low for borderline ovarian tumors. The possible predictive factors affecting false positive or false negative diagnosis should carefully be taken into consideration to reduce the diagnostic discrepancies.

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