# International Journal of Clinical Obstetrics and Gynaecology

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# Compatibility of intraoperative frozen sections for ovarian masses in less than 35 years of age with final histopathological examination

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**DOI:** https://doi.org/10.33545/gynae.2020.v4.i4e.654

**Abstract**
Thirty percentage of all cancers of female genital tract are ovarian cancer. Ovarian neoplasms are a heterogeneous group of tumours including sex cord stromal tumours, surface epithelial tumours, germ cell tumours, and secondary malignancies. The accuracy of intraoperative frozen section diagnosis of benign and malignant ovarian tumours is very good. This study is designed to assess compatibility of intraoperative frozen sections for ovarian masses in less than 35 years of age with final histopathological examination. A descriptive, prospective, observational study was conducted in Onco – gynaecology department, tertiary care teaching hospital. The study was conducted between July 2015 to May 2017. All the patients under 35 years of age who had ovarian masses and performed intraoperative frozen section were included during the study period. Unmatched frozen section and histopathological findings were seen in two cases. Accuracy of frozen section in diagnosis of benign tumour was 95.65%, borderline tumour was 100% and for malignant tumour was 95.65%. The accuracy of intraoperative frozen section is high, so it is reliable diagnostic tool to assess ovarian mass intraoperatively. It is very important to determine the type and extent of surgery particularly in young women when fertility is concern.

**Keywords:** intraoperative frozen, ovarian masses, final histopathological examination

## Introduction

Thirty percentage of all cancers of female genital tract are ovarian cancer. In 2000, Worldwide the total number of Ovarian cancer cases has been estimated to be 1, 92,000 per year. Ovarian cancer ranks fifth in cancer deaths in worldwide and third among the female genital tract malignancy in India with age-adjusted standardized ratio of 6.7/100,000. During the period 2004–2005, in India proportion of Ovarian cancer varied from 1.7 to 8.7 % of all female cancers in urban and rural area. The five-year relative survival rate is around 25.4 % for ovarian cancer. Higher survival is observed in patients younger than 35 years [1].

Ovarian neoplasms are a heterogeneous group of tumours including sex cord stromal tumours, surface epithelial tumours, germ cell tumours, and secondary malignancies. The overall management plan for germ cell tumours is different from surface epithelial tumours in respect of conservative surgical approach and fertility preservation. For surface epithelial tumours, the surgical option is different for benign, borderline, and malignant tumours. In malignant cases, staging laparotomy (total abdominal hysterectomy with bilateral salpingo-oophorectomy, pelvic, and para-aortic lymph node sampling, peritoneal sampling is performed. Benign tumours are generally managed with cystectomy especially for young women who want to preserve fertility. A conservative approach is usually applied in borderline tumours with limited omental sampling and omission of lymph node dissection if they are clinically not enlarged. Fertility sparing options can also be applied in young patients [2].

In differentiating between benign, borderline and malignant cases, tumour markers have only limited value. Intraoperative Frozen section is a diagnostic technique performed on tissue, which is frozen with liquid nitrogen, sectioned with cryostat, stained. It is viewed under the microscope by a pathologist who has been informed preoperatively. The result will provide a primary diagnosis, so helping the operating surgeons to decide on further management especially for the extent of surgery. Other important point is diagnosis of benign or malignant mass and confirmation of clinical diagnosis of malignancy. Frozen section diagnosis of ovarian tumours is commonly used in making this diagnosis and to decide the course of surgery [3]. So, the accuracy

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of this method is very important. The accuracy of intraoperative frozen section diagnosis of benign and malignant ovarian tumours is very good. This study is designed to assess compatibility of intraoperative frozen sections for ovarian masses in less than 35 years of age with final histopathological examination

## Material and methods
A descriptive, prospective, observational study was conducted in Onco – gynaecology department, tertiary care teaching hospital. The study was conducted between July 2015 to May 2017. The study was conducted after approval from institutional ethics committee. All the patients under 35 years of age who had ovarian masses and performed intraoperative frozen section were included during the study period. Patient who refused to participate in the study, and who received some treatment (surgery, chemotherapy) outside the institute were excluded from the study.
We included patients who fulfilled the inclusion criteria. Patients recruited in the study on pro rata basis and all the patients participating in the study were explained clearly about the purpose and nature of the study in the language they can understand and written informed consent was taken before including them in the study. Data was collected using case record form (CRF) by means of individual patient interview and hospital files. The CRF comprised of socio-demographic details (age, marital status.), diagnosis, frozen section, histopathological findings.

The data was entered into Microsoft office excel and analysed by epiinfo software. Qualitative variables were described using the absolute (N) and relative (%) frequencies. Important indices were calculated by using these formulas: sensitivity = a/a+c, specificity = d/b+d Poistive predictive value = a/a+b negative predictive value = d/b+d (Table 1)

## Results
In this study, mean age group for benign tumour was 24.8±7.71, for borderline tumour was 24.29±7.75 and for malignant tumour was 24.6±7.55. Most of the patients were Hindu (89.13) married (73.91) and from rural locality (73.91). In total 46 patients, 25 patients were having benign mass, 5 patients were having borderline mass and 16 patients were having malignant mass. Unmatched frozen section and histopathological findings were seen in two cases. Accuracy of frozen section in diagnosis of benign tumour was 95.65%, borderline tumour was 100% and for malignant tumour was 95.65%. Other diagnostic values for frozen section were given in Table 4.

**Table 1:** Cross table for estimation of diagnostic values of frozen section

| Intraoperative Frozen Section | Final HPE report | |
|---|---|---|
| | + | - |
| + | a | b |
| - | c | d |

**Table 2:** Demographic characteristics

| Characteristics | Benign | Borderline | Malignant | Total |
|---|---|---|---|---|
| Age (Years) | 24.8±7.71 | 24.29±7.75 | 24.6±7.55 | 24.82±7.62 |
| **Religion** | | | | |
| Hindu | 22 (47.83) | 5 (10.87) | 14 (30.43) | 41 (89.13) |
| Muslim | 3 (6.52) | 0 (0.00) | 2 (4.35) | 5 (10.87) |
| **Locality** | | | | |
| Rural | 18 (39.12) | 4 (8.70) | 12 (26.09) | 34 (73.91) |
| Urban | 7 (15.22) | 1 (2.17) | 4 (8.70) | 12 (26.09) |
| **Marital status** | | | | |
| Married | 19 (41.30) | 4 (8.70) | 11 (23.91) | 34 (73.91) |
| Unmarried | 6 (13.05) | 1 (2.17) | 5 (10.87) | 12 (26.09) |

**Table 3:** Correlation between intraoperative frozen section with final histopathological Examination

| Frozen Section | Final Histopathological Examination | | | |
|---|---|---|---|---|
| | Benign | Borderline | Malignant | Total (n) |
| Benign | 24 | 0 | 1 | 25 |
| Borderline | 0 | 5 | 0 | 5 |
| Malignant | 1 | 0 | 15 | 16 |
| Total | 25 | 5 | 16 | 46 |

**Table 4:** Estimation of diagnostic values of frozen section in diagnosis of ovarian masses

| Frozen Section | Benign | Borderline | Malignant |
|---|---|---|---|
| Accuracy (%) | 95.65 | 100 | 95.65 |
| Sensitivity (%) | 96 | 100 | 93.75 |
| Specificity (%) | 95.24 | 100 | 96.67 |
| Positive Predictive Value (%) | 96 | 100 | 93.75 |
| Negative Predictive value (%) | 95.24 | 100 | 96.67 |

## Discussion
There is no any recommended preoperative diagnostic tool to determine the histology of an ovarian tumour. Most common clinical presentation of ovarian tumour is abdominal mass and abdominal pain, but there is no way to assess its malignant potential except through surgery. Intraoperative Frozen section may help the gynaecologist to decide on the type of surgery for patients with ovarian tumour, especially when fertility is a concern in age less than 35 years.
The accuracy of frozen section is very important. In our study, accuracy for benign tumour was 95.65%, for borderline tumour was 100% and for malignant tumour was 95.65%. In Mokhles et al. study, accuracy for benign tumour was 96.8%, for borderline tumour was 97.3% and for malignant tumour was 97.3% [4]. In Arshad et al. study, accuracy for benign tumour was 85.9%, for borderline tumour was 91.3% and for malignant tumour was 91.3% [5].
In our study, sensitivity for benign tumour was 96%, for borderline tumour was 100% and for malignant tumour was 93.75%. In Mokhles et al. study, sensitivity for benign tumour was 99.3%, for borderline tumour was 62.5% and for malignant tumour was 86.7% [4]. In Arshad et al. study, sensitivity for benign tumour was 95,6%, for borderline tumour was 76.2% and for malignant tumour was 69.2% [5].
In our study, specificity for benign tumour was 95.24%, for borderline tumour was 100% and for malignant tumour was 96.67%. In Mokhles et al. study, specificity for benign tumour was 86.8%, for borderline tumour was 98.9% and for malignant

tumour was 99.4% [4]. In Arshad *et al.* study, specificity for benign tumour was 85.1%, for borderline tumour was 88.7% and for malignant tumour was 100% [5].

## Conclusion
The accuracy of intraoperative frozen section is high, so it is reliable diagnostic tool to assess ovarian mass intraoperatively. It is very important to determine the type and extent of surgery particularly in young women when fertility is concern.

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