

**Role of frozen section in the diagnostic evaluation of ovarian masses.**

Shamima Akhter, Benish Sultan, Razia Banoo, Sheikh Bilal Ahmed

**Abstract****Background:** To determine the role of the intraoperative frozen section in diagnosing ovarian masses.**Materials and Methods:** The present study was conducted in the Department of Surgical Oncology, Government Medical College Srinagar, over three years. Patients with ovarian neoplasm were subjected to an intraoperative frozen section, and the results were compared with the final histopath.**Results:** A total of 266 cases were studied, of which 37.9% were benign, 7.8% were borderline and 55.2% were malignant. Among benign, Surface epithelial 58.4%, Germ cells 19.8%, Sex cord 7.9%, and others 13.8%. Among Malignant, Surface epithelial 81.6%, Germ cells 10.2%, Sex cord 4.08%, and others 4.08%.**Conclusion:** Frozen section biopsy allows the surgeon to establish a rapid diagnosis and avoid unnecessary staging laparotomy**JK-Practitioner2024;29(2-3):43-47****Introduction**

Ovarian cancer is the second most common gynecological malignancy in females and the common cause of death due to late diagnosis. A considerable number of neoplasms are found in ovaries because of the totipotent and multipotent nature of ovarian cells; as a result, ovarian lesions may be benign, borderline, and malignant [1,2] WHO classifies ovarian lesions into epithelial, mesenchymal, germ cell, sex cord, and secondary malignancies. The frozen section is used in pathology and surgical settings to rapidly prepare and examine tissue samples during surgery or other medical procedures[8]. It involves the freezing and immediate microscopic evaluation of fresh tissue specimens to obtain a preliminary diagnosis or essential information about the tissue's characteristics. The frozen section technique was discovered by Welsh in 1891 to identify various ovarian neoplasms with a high degree of accuracy and helps to choose appropriate surgical procedures[3]. Diagnostic modalities for ovarian tumors are tumor markers and imaging among tumor markers, CA-125, AFP,  $\beta$ -hcg, Inhibin AB, and LDH. Imaging includes USG, MRI, and CT-scan. Imaging has limitations in diagnosing ovarian malignancies. Frozen section biopsy plays a vital role in establishing the diagnosis of ovarian lesions, thus helping the surgical approach. The accuracy of frozen section biopsy for ovarian tumors has been reported from 85-95%[8,11,12,13,14].

**Material and methods:**

The study was prospective pilot study, conducted in the Department of surgical oncology, GMC Srinagar, from 2019 to 2022 after local institutional ethical clearance, consent was taken from all patients included in the study. clinical, laboratory, and radiological data were collected for each case and was analysed by spss software. Ovarian neoplasms with at least one elevated tumor marker would be taken for frozen section. Radiologically solid, solid cystic, and cystic with T2 hyperintense nodules were included. After the frozen section, tissues were put in formalin and sent for routine processing. The results of the frozen section were compared with the paraffin section diagnosis. Both neoplastic and non-neoplastic lesions were included. Overall accuracy was calculated from the discrepancy between frozen and paraffin

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biopsies: the sensitivity, specificity, positive predictive value, and negative predictive value calculated from the data.

**Statistical Analysis**

SPSS software version 2023 was used. The accuracy, sensitivity and specificity of frozen section biopsy were calculated for all categories of tumors like benign, borderline and malignant by 2x2 table.

**Results**

A total of 266 cases were subjected to frozen section biopsy and diagnosis. The age group of patients ranged from 10-80 years; the most common age group affected was the 5th, 4th, and 6th decades. Of 266 cases, 101 were benign; the most common benign lesion was cystadenoma (22.1%) followed by mature cystic teratoma (7.5%), Brenner, Endometrioma (3%), and others 5.2%.

Table 1: Age Distribution of Ovarian Tumors= 266

Type of Tumour	Benign	Borderline	Malignant	Total
<10	1	----		
10-20	17	3		23
21-30	28	5	11	5
31-40	21	5	78	38
41-50	15	4		
51-60	7	1		
61-70	6	----		
71-80	6	----		
<b>Total</b>	<b>101</b>	<b>18</b>	<b>144</b>	<b>66</b>

Fig 1: depicts the histopathology pattern in study population:

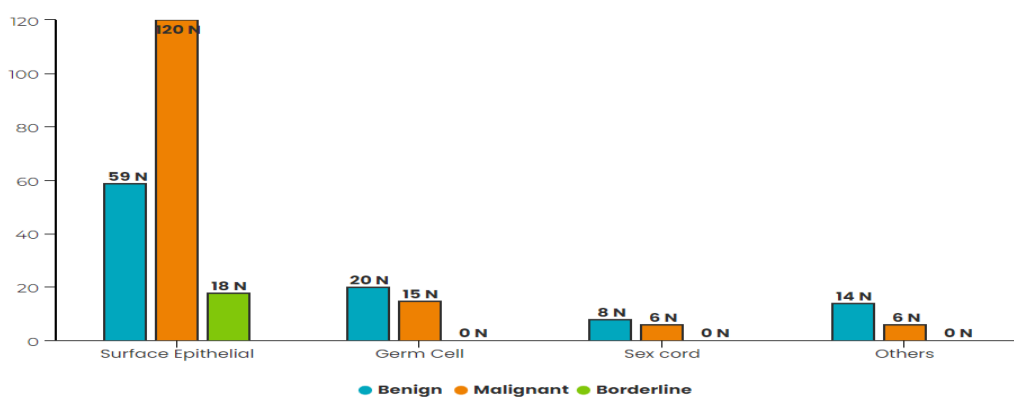


Table 2: Histopathological distribution of tumors.

	Benign	Malignant	Borderline	Total	Percentage
<b>Surface Epithelial</b>	59(22.1%)	120(45.1%)	18(6.7%)	197(74.06%)	74.06%
<b>Germ cell</b>	20(7.5%)	15(5.6%)	-----	35(13.15%)	13.15%
<b>Sex cord</b>	8(3%)	6(2.22%)	-----	14(5.26%)	5.26%
<b>Others</b>	14(5.26%)	6(2.22%)	-----	20(7.51%)	7.5%
<b>Total</b>	<b>101</b>	<b>147</b>	<b>18</b>	<b>266</b>	

Among borderline tumors, 14(5.2%) were mucinous borderline, and (1.5%)<sup>4</sup> were serous borderline. Among malignant tumors, serous (95) carcinoma was the most common malignant tumor, and mucinous (25), germ cell (5.6%), sex cord (2.2%), and others (2.2%). Out of 266 cases, 256 of frozen section biopsy diagnoses were compatible with the final

histopathological diagnosis (paraffin section). Only ten cases were incompatible with the paraffin section, out of which five reported benign cases were two malignant and three borderline. Table 3

Three cases were reported as borderline; one was malignant, two were benign

Table 3: Statistical analysis of frozen/histopathological diagnosis. Statistical analysis tests- sensitivity, specificity, positive predictive value, negative predictive values are generated using statistical formulas by 2x2 table

Frozen Diagnosis	Histopathological diagnosis			Total
	Benign	Borderline	Malignant	
Benign	91	3	2	96
Borderline	--	18	3	21
Malignant	1	1	147	149
Total				266

Table 3:(Incompatible cases between frozen and paraffin sections)

Statistical Value	Benign	borderline	malignant
Sensitivity	94.79%	85.7%	98.6%
Specificity	97.2%	98.8%	98.3%

**Discussion:**

The study includes patients from 10-80 years. A maximum number of patients with ovarian tumors were seen in the age group of 50-60 years, followed by 40-50 years. This was comparable to previous studies. The total number of ovarian neoplasms studied was 266; 101 cases were classified as Benign with surface epithelial 59, germ cell 20, sex cord 8, and others 14, including endometrioma cystadenoma and granulomatous lesions. Out of 266, 147 cases were classified as Malignant, with surface epithelial 120, germ cell 15, sex cord 6, and others 6, including Krukenberg tumors, and 18 cases were classified as Borderline tumors.

Among the Surface Epithelial cases, the majority (45.1%) were classified as Malignant, indicating a higher occurrence of malignant surface epithelial tumors[10]. Germ cell tumors accounted for 13.15% of the total cases, sex cord 5.2%, and others 7.5% [7] the present study revealed 256 compatible cases between frozen section biopsy diagnosis and paraffin biopsy diagnosis. Ten cases were incompatible, with an overall accuracy of 96.2% [12,14]. In our study, 10 cases showed incompatible results between frozen and

paraffin biopsy, with most of the instances underdiagnosed. This accuracy is consistent with studies like Hashmi A et al., Yazdani A et al., and Yeo EL et al. [11,13,16]. The frozen section of the ovarian neoplasm aims to distinguish benign, borderline, and malignant tumors for an appropriate surgical approach. Among the underdiagnosed, 3 cases were borderline tumors, which came out as malignant on final histopathology[20]. The most common tumor underdiagnosed was mucinous, as there are mixed components in different areas of mucinous tumors, unlike serous tumors, which are uniform. Germ cell and sex cord tumors were diagnosed easily compared to the borderline. None of the cases were overdiagnosed in our study.

The overall sensitivity of frozen section diagnosis was 93.03%, and specificity 98.1%. For benign, sensitivity was 94.7%, malignant 98.6% and borderline 85.7%, consistent with studies like Hashmi A, Sukumaran R, and others [11,17,18]. The low sensitivity of borderline tumors was due to mucinous histology and, thus, tumor heterogeneity [5,11]. Accurate diagnosis of ovarian tumors is essential to avoid over-treatment or undertreatment, especially in young patients [19,21].

For malignant lesions, complete surgical staging is needed.

The specificity of frozen section biopsy in our study for benign, borderline, and malignant was 97.2%, 98.8%, and 98.3%, respectively [11,13,16,18]

#### Conclusion

The frozen section was an accurate and valuable modality in the intraoperative evaluation of patients with ovarian neoplasm. Frozen biopsy reports can help to decide the type and extent of surgery and avoid second surgery in patients with ovarian neoplasm

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