

Accuracy of Intraoperative Frozen Section in the Diagnosis of Ovarian Neoplasms in Comparison with Histopathology in Deciding the Extent of Surgery – A Comparative Study

Dr.P.Supriya¹, Dr.G.Shobha², Dr.H.Anupama³

¹Assistant Professor Of Obstetrics &Gynaecology, Gandhi Medical College, Secunderabad

²Professor Of Obstetrics &Gynaecology, Gandhi Medical College, Secunderabad

³Professor Of Obstetrics &Gynaecology, Gandhi Medical College, Secunderabad

Abstract:

Objectives: Accuracy of intraoperative frozen section in comparison with histopathology in diagnosis of ovarian neoplasm to decide the extent of surgery.

Materials and methods: Hospital based prospective study done on 30 patients admitted to department of Gynecology and Obstetrics , Gandhi Hospital, Secunderabad who are clinically and sonologically diagnosed to have ovarian neoplasms during the period of December 2009 to October 2011.

Results: Intraoperative frozen section diagnosis of all 30 ovarian specimens revealed 70% benign tumors, 13% borderline tumors, 16% malignant tumors. The final paraffin section diagnosis revealed 66.6% benign tumors, 10% borderline tumors, 23.3% malignant tumors. The overall accuracy of frozen section analyses is 90%. The sensitivity and specificity for benign, borderline and malignant tumors are 100%, 66.7%, 71.4% and 90%, 92.8%, 100% respectively. The positive predictive value(PPV) and negative predictive value(NPV) for benign, borderline, malignant tumors are 95.2%, 50%, 100% and 100%, 96.3%, 92.5% respectively.

Conclusion : Intraoperative frozen section diagnosis appears to be an accurate technique for the histopathologic diagnosis of ovarian tumors. The results can be used to guide type and extent of surgery, especially with experienced pathologists. However, limitations in use of frozen section must be recognized such as large specimens, especially mucinous subtype. Regular re-evaluation or consultation concerning disagreements between frozen section diagnosis and final permanent paraffin diagnosis should be conducted by both surgeons and pathologists as part of quality assurance to determine the most appropriate intraoperative management for patients with ovarian tumors.

Keywords: Frozen section, Ovarian tumor, Accuracy

I. Introduction

Ovarian neoplasms are one of the leading cause of morbidity and mortality among the gynecological cancers and the fifth most important cause of cancer death among women. Correct intraoperative histopathological diagnosis in the way of frozen section is imperative to ensure proper surgical staging and is carried out prior to performing definitive surgery to prevent overtreatment or undertreatment of patients with ovarian neoplasms. The surgical management of ovarian neoplasms depends on their correct categorization as benign, borderline or malignant, which differ with respect to their biological characteristics, management and prognosis.

Benign and borderline tumors can be adequately treated with conservative surgery which may involve preservation of fertility in younger women, in contrast malignant neoplasms usually require extensive surgery with total abdominal hysterectomy, bilateral salphingo-oophorectomy and omentectomy along with pelvic and retroperitoneal lymphednectomy and peritoneal sampling.

Hence the need for an intraoperative accurate diagnosis by frozen section became a vital part in diagnosing the neoplasm and in deciding the extent of surgery before delayed paraffin section report is available .

II. Materials And Methods

Hospital based prospective study done on 30 patients admitted to department of Gynecology and Obstetrics , Gandhi Hospital, Secunderabad who are clinically and sonologically diagnosed to have ovarian neoplasms during the period of December 2009 to October 2011.

Inclusion criteria:

- ✓ Clinically benign ovarian tumors
- ✓ Young patients in whom Fertility preservation surgeries planned
- ✓ Inconclusive imaging and tumor markers
- ✓ Intraoperatively diagnosed ovarian mass

Exclusion criteria:

- ✓ Clinically malignant ovarian tumors

Proforma is designed for each patient. Data collected by history, clinical, radiological, biochemical examination. After thorough investigation, patient posted for surgery. After gross examination of tumor, sections are obtained from suspicious areas. 7 to 8 micrometer sections obtained in cryostat machine and stained with hematoxylin-eosin and are studied in low and high power by pathologist. The average time taken for entire procedure is 15 min. the report is categorized as benign, borderline, malignant tumors. the frozen section diagnosis is compared with final paraffin section diagnosis

III. Results

Intraoperative frozen section diagnosis of all 30 ovarian specimens revealed 70% benign tumors, 13% borderline tumors, 16% malignant tumors. The final paraffin section diagnosis revealed 66.6% benign tumors, 10% borderline tumors, 23.3% malignant tumors.

The overall accuracy of frozen section analyses is 90%. The sensitivity and specificity for benign, borderline and malignant tumors are 100%, 66.7%, 71.4% and 90%, 92.8%, 100% respectively. The positive predictive value (PPV) and negative predictive value (NPV) for benign, borderline, malignant tumors are 95.2%, 50%, 100% and 100%, 96.3%, 92.5% respectively.

Results of frozen section and histopathological diagnosis in various categories of ovarian neoplasms

CATEGORY	FROZEN SECTION	HISTOPATHOLOGICAL DIAGNOSIS
Benign tumors	21(70%)	20(66.6%)
Borderline tumors	4(13.3%)	3(10%)
Malignant tumors	5(16.6%)	7(23.3%)
Total cases	30	30

Reports differing

S.NO	FROZEN SECTION	HISTOPATHOLOGY	cases
1.	Borderline mucinous cystadenoma	Mucinous cystadenocarcinoma	2
2.	Benign serous cystadenoma	Borderline serous cystadenoma	1

Frozen section accuracy

	Benign	Borderline	Malignant
sensitivity	100%	66.7%	71.4%
specificity	90%	92.8%	100%
PPV	95.2%	50%	100%
NPV	100%	96.3%	92.5%

Frozen section Vs Histopathology

Tumors	Frozen section	Histopathology
Malignant + Borderline	9	8
Benign	21	22

Accuracy of frozen section over histopathology

Sensitivity	87.5%
specificity	90.9%
Positive predictive value	77.8%
Negative predictive value	95.2%

IV. Discussion

Intraoperative frozen section for use in diagnosis of ovarian tumors is of great value. In some cases it can help surgeons avoid under-treatment or overtreatment of patients.

A review of the literature reveals overall accuracy of intraoperative frozen section diagnosis for ovarian tumor ranges between 86 and 97%²⁻⁶. The overall accuracy of frozen section in diagnosing ovarian neoplasm in this study is 90%. Our study analyses done on 30 patients revealed sensitivity for benign tumors in our study is 100%. Sensitivity rates reported in the literature are 98 to 99%⁷⁻⁹. Only 1 out of 21 diagnosed as benign on frozen section turned out to be borderline on final histopathology. In our study inadequate and inappropriate tissue sampling due to huge tumors during surgery was the reason for the cases with benign frozen but borderline paraffin block results.

In our study on 30 patients, sensitivity for malignant tumors was 71.4%. A recently published meta analysis of 18 studies comparing frozen and histopathology showed a sensitivity for malignant tumors as 71 to 100%². In our study 5 diagnosed as malignant on frozen turned to be malignant. Frozen section missed 2 cases

of malignancy among borderline, however they were early stage cancers. At our institute borderline tumors were treated like malignant.

In our study on 30 patients sensitivity for borderline tumors was 66.7%. studies report sensitivity between 0 to 88.7%¹⁰⁻¹³. 2 cases out of 4 borderline diagnosed by frozen section, turned out to be malignant on histopathology. In a large borderline tumor there may be only few foci of frank malignancy that may require large number of frozen section samples. The large tumor size and multilocular pattern of mucinous tumors are reported to have a negative effect on accuracy of frozen section diagnosis^{3,9,13,14,15}. Multivariate analysis found that the mucinous type was the only independent factor in misdiagnosis of borderline neoplasms. Some authors suggested underdiagnosis is due to sampling errors, lack of expert pathologist, less information regarding tumors status, peritoneal implants have also been studied.

In conclusion, intraoperative frozen section diagnosis is generally accurate and can be used as one piece of evidence for the surgeon to use in determining the type and extent of initial surgery to be performed. However, frozen section has limitations such as sampling error, deferred diagnosis and interpretation error. Good intraoperative communication between surgeons and pathologists and regular clinico-pathologic conferences, especially in cases with discordant diagnosis, can maximize accuracy and minimize limitations such as interpretation error and deferred diagnosis.

References

- [1]. Wakahara F, Kikkawa F, Nawa A, Tamakoshi K, Ino K, Maeda O, et al. Diagnostic efficacy of tumor markers, sonography, and intraoperative frozen section for ovarian tumors. *Gynecol Obstet Invest* 2001; 52: 147-52.
- [2]. Geomini P, Bremer G, Kruitwagen R, Mol BW. Diagnostic accuracy of frozen section diagnosis of the adnexal mass: a metaanalysis. *Gynecol Oncol* 2005; 96: 1-9
- [3]. Baker P, Oliva E. A Practical approach to intraoperative consultation in gynecological pathology. *Int J Gynecol Pathol* 2008; 27:353-65.
- [4]. Acs G. Intraoperative consultation in gynecologic pathology. *Semin Diagn Pathol* 2002; 19:237-54.
- [5]. Medeiros LR, Rosa DD, Edelweiss MI, Stein AT, Bozetti MC, Zelmanowicz A, et al. Accuracy of frozen section analysis in the diagnosis of ovarian tumors: a systematic quantitative review. *Int J Gynecol Cancer* 2005 ; 15: 192-202
- [6]. Rakshan A, Zham H, Kazempour M. Accuracy of frozen section diagnosis in ovarian masses: experience at a tertiary oncology center. *Arch Gynecol Obstet* 2009; 280: 223-8
- [7]. Gol M, Baloglu A, Yigit S, Dogan M, Aydin C, Yensel U. Accuracy of frozen section diagnosis in ovarian tumors: is there a change in the course of time? *Int J Gynecol Cancer* 2003; 13: 593-7.
- [8]. Houck K, Nikrui N, Duska L, Chang Y, Fuller AF, Bell D, et al. Borderline tumors of the ovary: correlation of frozen and permanent histopathologic diagnosis. *Obstet Gynecol* 2000; 95: 839-43.
- [9]. Tangjitgamol S, Jesadapatrakul S, Manusirivithaya S, Sheanakul C. Accuracy of frozen section in diagnosis of ovarian mass. *Int J Gynecol Cancer* 2004; 14: 212-9.
- [10]. Rose PG, Rubin RB, Nelson BE, Hunter RE, Reale FR. Accuracy of frozen-section (intraoperative consultation) diagnosis of ovarian tumors. *Am J Obstet Gynecol* 1994; 171: 823-6.
- [11]. Obiakor I, Maiman M, Mittal K, Awobuluyi M, DiMaio T, Demopoulos R. The accuracy of frozen section in the diagnosis of ovarian neoplasms. *Gynecol Oncol* 1991; 43: 61-3
- [12]. Ilvan S, Ramazanoglu R, Ulker Akyildiz E, Calay Z, Bese T, Oruc N. The accuracy of frozen section (intraoperative consultation) in the diagnosis of ovarian masses. *Gynecol Oncol* 2005; 97: 395-9
- [13]. Twaalfhoven FC, Peters AA, Trimbos JB, Hermans J, Fleuren GJ. The accuracy of frozen section diagnosis of ovarian tumors. *Gynecol Oncol* 1991; 41: 189-92.
- [14]. Pinto PB, Andrade LA, Derchain SF. Accuracy of intraoperative frozen section diagnosis of ovarian tumors. *Gynecol Oncol* 2001; 81: 230-2
- [15]. Wang KG, Chen TC, Wang TY, Yang YC, Su TH. Accuracy of frozen section diagnosis in gynecology. *Gynecol Oncol* 1998; 70: 105-10