

Audit of Intra-Operative Ovarian Frozen Section Accuracy in a Single Tertiary Centre

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INTRODUCTION:

Ovarian masses are difficult to diagnose pre-operatively as malignant or benign. Tumour markers and radiological features provide useful information, however, diagnosis based on post-operative histological examination of paraffin-fixed tissue remains the gold standard.

A frozen tissue sample obtained and examined intra-operatively enables a preliminary histological diagnosis to be made at the time of surgery. This additional information may affect the type or extent of surgery undertaken.

A Cochrane review published in 2016 showed the use of frozen sections to diagnose ovarian malignancies had a 90% average sensitivity and 99% average specificity with less accuracy for borderline tumours (1).

OBJECTIVES:

We aimed to determine the concordance of diagnoses based on intra-operative frozen sections with paraffin-fixed sections in our hospital. Secondary outcomes were a review of factors related to concordance such as tumour size and weight.

METHOD:

A retrospective review was undertaken of women who had intra-operative frozen sections taken from ovarian masses in a single tertiary centre over a 3-year period (1 January 2015 to 31 December 2017).

Data was obtained from electronic patient records and a pathology database. Masses were classified as benign, borderline, malignant, or indeterminate.

Concordance occurred when the paraffin-fixed section diagnosis was the same as the frozen section diagnosis. Discordance occurred whenever the frozen section over - or under - called the gold standard diagnosis.

RESULTS:

176 women were included in this study. **Our overall concordance was 86%** (Table 1). Concordance was significantly lower in masses larger than 10cm compared to smaller masses (81% vs 97%, $\chi^2 = (1, N=174) = 8.09, p = 0.004$). (Table 2).

100% of frozen sections categorised as malignant were malignant on paraffin-fixed section and 90% of frozen sections categorised as benign were benign on paraffin-fixed section (Figure 1). However, only 77% of masses which were malignant on paraffin-fixed section were categorised as malignant on frozen section (Figure 2).

Under-called (10%)

Twelve malignant masses were under-called benign (n=3), borderline (n=6), and indeterminate (n=3). Of these cases, six received full staging, three were partially staged and the remaining three received no staging and likely required subsequent surgeries. Six borderline masses were under-called as benign, one case had her uterus preserved.

Over-called (4%)

Seven benign masses were over-called borderline (n=3), and indeterminate (n=4). Two of these cases received full staging and a further four had a hysterectomy.

Table 1. Accuracy of frozen section diagnosis to classify gold standard paraffin-fixed diagnosis. Concordant results are highlighted in bold.

		Paraffin-fixed diagnosis (Gold Standard)				
		Total = 176	Benign n=91	Borderline n=31	Malignant n=53	Indeterminate n=1
Frozen section diagnosis	Benign n=93		84	6	3	0
	Borderline n=34		3	25	6	0
	Malignant n=41		0	0	41	0
	Indeterminate n=8		4	0	3	1

Figure 1. Gold standard paraffin-fixed diagnosis by frozen section classification.

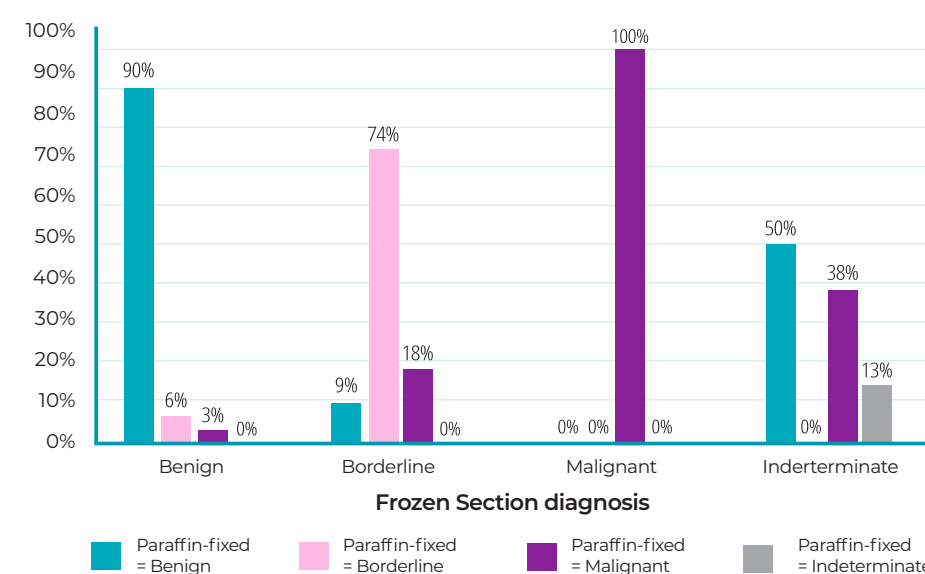


Figure 2. Frozen section classification of gold standard paraffin-fixed diagnosis.

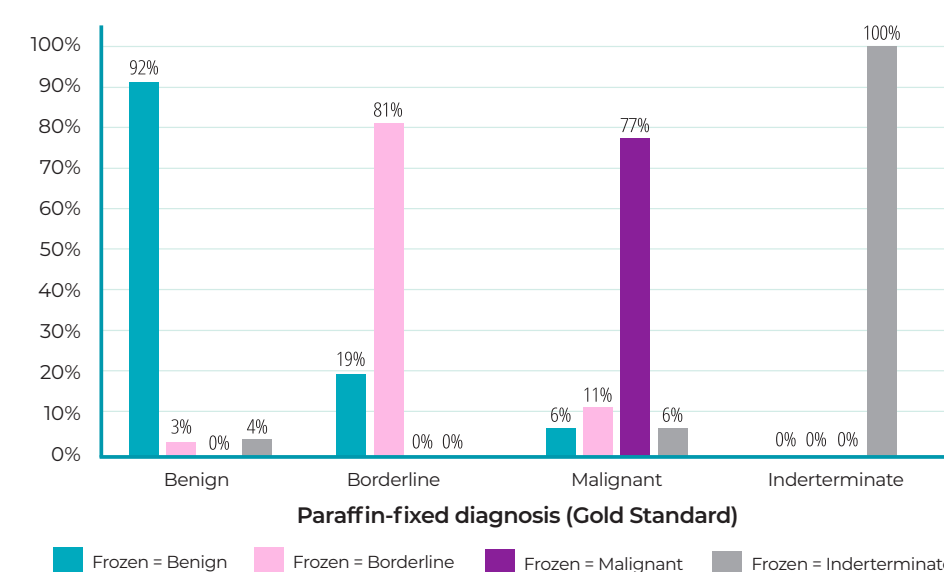
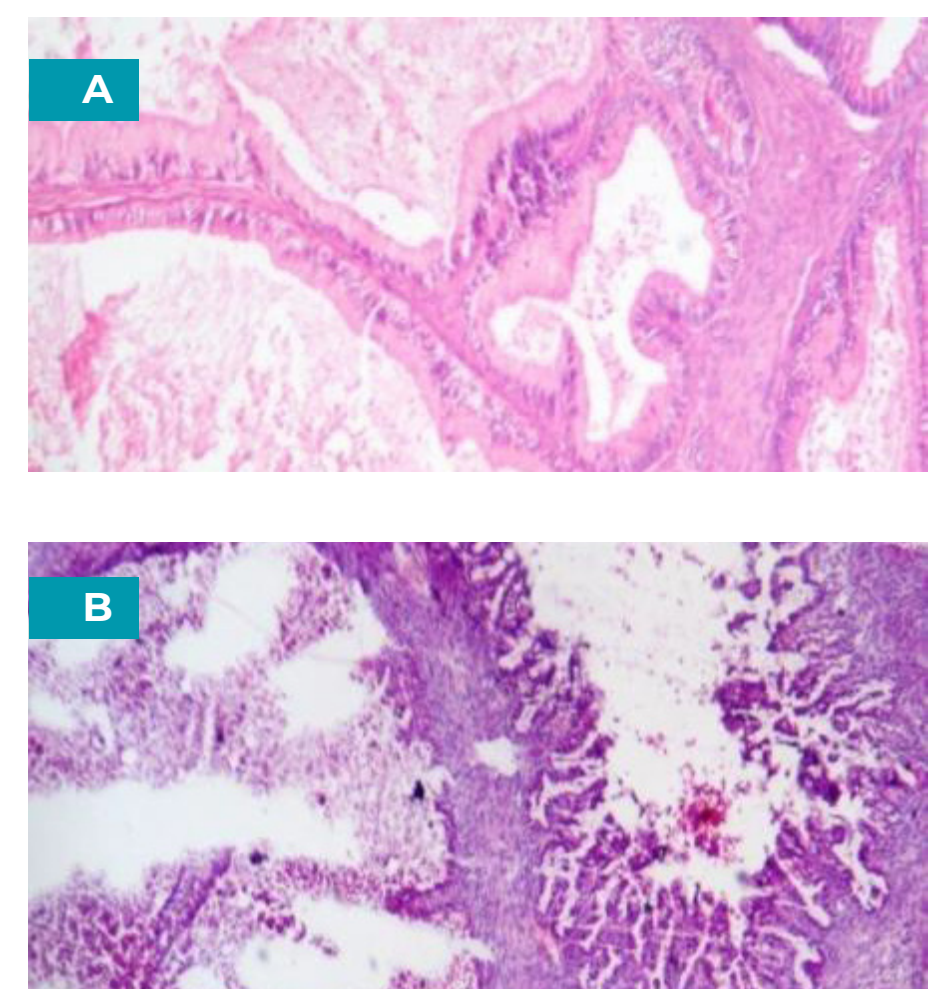


Table 2. Factors affecting concordance

		Concordance	P Value
Size - Largest dimension (cm)	< 10 (n=61)	97%	$\chi^2 (1, N=174) = 8.09, p=0.004$
	≥ 10 (n=113)	81%	
Weight (g)	< 500 (n=80)	90%	Not significant p=0.131
	≥ 500 (n=82)	82%	

Note: Size not available for 2 masses, weight not available for 14 masses.

Figure 3. 10x view of mucinous cystadenocarcinoma as shown on frozen section (A) and paraffin-fixed sample (B)(2).



CONCLUSION:

Our frozen section accuracy is similar to international reports, as is the prevalence of malignancy. Caution should be shown if a mass measures 10cm or more. A frozen section is a useful tool to use alongside clinical picture at time of surgery and can help avoid unnecessary staging or need for subsequent surgeries. Knowledge of the accuracy of our frozen sections locally is advantageous for our women when counselling pre-operatively and intra-operatively when determining surgery extent. Limitations of our study are that it is retrospective with a small sample size and single centre only.

REFERENCES:

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