

INTRA-OPERATIVE CYTOLOGY AND FROZEN SECTIONS OF BREAST LESIONS: A COMPARISON FROM A SAUDI TEACHING HOSPITAL

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Objective: Evaluate the usefulness of intraoperative cytology in providing rapid and accurate diagnosis for various breast lesions and to compare its diagnostic yield with that of frozen and paraffin sections.

Setting: All surgically excised breast lesions submitted to the Histopathology and Cytology Department at King Khalid University Hospital (KKUH), Saudi Arabia during a period of 18 months (May 1993 till October 1994).

Subjects: Fifty Saudi female patients admitted to the surgical wards at KKUH because of breast-related clinical complaints and who have had subsequent surgical excision of their breast lesions.

Design: Touch imprints and scalpel blade scrapes were made from the cut surfaces of 50 different breast lesions. The cytological preparations were stained using the "Diff-Quick" method. Frozen sections were also performed on all cases.

Results: There were 28 benign and 22 malignant lesions. There were three cases of significant discrepancies between the intra-operative cytology and frozen section diagnosis. Our findings indicate that intra-operative cytology alone gave the correct diagnoses in 94% of the cases examined.

Conclusion: Intraoperative cytology is a reliable and cost-effective technique which can be used as an adjunct to frozen section of breast lesions. The histopathologist should, however, be aware of the patient clinical details, mammographic findings and the macroscopic appearances of the lesions examined. Bahrain Med Bull 1996;18(1):

In 1927, Dudgeon and Patrick introduced wet films as a rapid method for the examination of fresh tissues in the operating room^{1,2}. Since then the cytological smears and imprints have been used by many pathologists, but interest in the technique has grown recently. In this paper, we present our experience with intra-operative cytology of breast lesions.

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A comparison between the frozen, paraffin sections and the cytological diagnoses of these will also be made.

METHODS

Over a period of 18 months (May 1993 till October 1994), cytological preparations were made from 50 consecutive breast lesions submitted to the Pathology Laboratories at King Khalid University Hospital in Riyadh, Saudi Arabia. Touch imprints and scalpel blade scrapes from the cut surfaces were prepared.

The smears were air-dried and stained with a modified Wright stain (the diff-Quick method). Smear preparation and staining were completed in less than two minutes and a diagnosis was given on the basis of both the gross pathological and intra-operative cytological findings.

RESULTS

Of the 50 breast lesions examined, 28 were benign and 22 were malignant (Table 1). There were three cases showing significant discrepancies between the intra-operative cytology and frozen section diagnosis.

Table 1
Intra-operative cytology and frozen section
diagnosis of 50 breast lesions

No of cases	Final diagnosis	Impression on gross examination	Intra-operative cytological diagnosis	Frozen section diagnosis
19	Ductal carcinoma	Malignant	Carcinoma	Carcinoma
1	Angiosarcoma	Malignant (liver like cut surface)	Sarcoma NOS	Angiosarcoma
1	Invasive lobular carcinoma	Probably malignant	Benign	Invasive lobular carcinoma
1	Phyllode tumour of borderline malignancy	Benign	Benign	Deferred
6	Fibroadenoma	Benign	Fibroadenoma (5 cases) Carcinoma (1 case)	Fibroadenoma (all cases)
17	Cystic mastopathy	Benign	Cystic mastopathy	Cystic mastopathy
1	Duct ectasia	Benign cystic disease	Duct ectasia	Duct ectasia
1	Fat necrosis	Probably benign	Fat necrosis	Fat necrosis and small abscess formation
1	Mammary cyst	Benign cyst	Benign cyst	Benign cyst
2	Normal breast	Benign	Benign	Normal breast

tissue

In the first case, a false negative diagnosis was made. The observer made a diagnosis of fibroadenoma on the imprint and scraping preparations. Frozen section showed a rather cellular stroma in a fibroadenoma and the final diagnosis was deferred. The paraffin sections revealed a phyllodes tumour of borderline malignancy (Fig 1).

The second false negative diagnosis was an invasive lobular carcinoma. As the scrape method was not used, the smears were scanty. This case emphasizes the importance of obtaining smears of adequate cellularity before making a diagnosis.

The final diagnosis of the only cytologically false positive case was fibroadenoma. In this case mild to moderate nuclear pleomorphism was noticed in the breast epithelial cells on both the cytological and frozen preparations.

Our series contained one angiosarcoma which was diagnosed on both cytology and frozen sections as sarcoma NOS. We regard this provisional diagnosis as appropriate in the circumstances, the definitive diagnosis requiring examination of paraffin sections. These findings indicate that intra-operative cytology alone gave the correct diagnosis in 94% of the cases examined.

DISCUSSION

The diagnostic accuracy of imprint/ scrape cytology and the good agreement with frozen section diagnosis is between 94-97%^{4,8,9}. Our own investigations support these findings. Intra-operative cytological evaluation must be based on both macroscopic appearance of the lesion and the cytological features of the constituent cells (Table 1). If both the gross and cytological diagnoses are in agreement that a lesion is benign, it may be possible to dispense with the performance of a frozen section unless plans for immediate surgical intervention are being contemplated⁵.

When there is discrepancy between the gross and cytological diagnosis, a frozen section analysis should be performed⁶. If both the gross and the cytological analyses using both imprint and scrape techniques yield an unequivocal diagnosis of malignancy, a frozen section examination may not be necessary.

We agree with Pilar and Rubenstone⁸ that the "imprinted" piece of tissue should be flat and that no fat should be left extruding from the surface. It is also advisable to blot the surface of the specimen gently in order to remove excess blood and fluid. The architecture of the lesion is reasonably preserved when the touch imprint technique is used. In our opinion, the major disadvantage is that the preparations are less cellular than the smears obtained by scraping the cut surfaces of the lesions.

By comparing the overall accuracy of intraoperative cytology, frozen and paraffin sections as well as intra-operative findings, we found that the stromal component of a lesion with fibroadenomatous appearance was under evaluated, so that a diagnosis of phyllodes tumour was missed by both intra-operative cytology and frozen section.

In the case of phyllodes tumour encountered in this study, the intra-operative findings were consistent with large fibroadenoma but the final diagnosis was made on paraffin sections. Intra-operative cytology enabled us also to make the diagnosis of sarcoma NOS which was also suspected intra-operatively. In this

instance, frozen and paraffin sections provided more specific answer of angiosarcoma. Infiltrating lobular carcinoma (ILC) can be missed for mastitis on frozen section¹⁰. Furthermore, the inflammatory cells may align themselves in the form of Indian files fashion and show features typical of ILC. In our false negative case of ILC, the surgical and macroscopical examination findings were not conclusive for malignancy and the diagnosis on intra-operative cytology was that of mastitis. A point of interest was that the correct diagnosis was given on frozen section. This finding differs from the conclusions reached by other investigators^{9,10}.

In general, intra-operative cytology has many advantages in comparison with frozen section³⁻⁵. The amount of tissue that can be frozen for rapid intra-operative diagnosis is limited. However, the imprint and scrape techniques can easily cover a larger portion of the specimen, reducing errors due to inadequate sampling^{8,9,11}.

The cytological details provided by the intra-operative cytological preparations are superior to those provided by frozen sections because of the absence of freezing artifacts.

In addition, cryostat contamination can be avoided when potentially infectious specimens are diagnosed by intra-operative cytology^{5,11}. This point is particularly important in the Kingdom of Saudi Arabia because of the high incidence of tuberculosis.

When diagnosis is made by examination of cellular imprints and scrapings obtained from a small lesion or biopsy, it is possible to preserve the tissue for special studies like oestrogen receptor estimation and flow cytometry³⁻⁵. This is particularly important when the specimen is small. Very small specimens may be difficult to cut or too much tissue may be lost in the attempt to obtain an adequate frozen section¹⁰.

It is also our policy in this centre to use sets of scrape cytology smears as a first step in the training of junior pathologists before they start reporting fine needle aspiration preparations.

CONCLUSION

Intra-operative cytology is a reliable and cost-effective adjunct to frozen section technique when performed by experienced pathologists who have evaluated both the macroscopic and cytological appearances of the lesion. The histopathologist should be aware of the clinical setting and mammographic findings before rendering a diagnosis based on intra-operative cytology.

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