



## TOUCH IMPRINT CYTOLOGY- NOVEL METHOD FOR RAPID ASSESSMENT OF SURGICAL MARGINS

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### ABSTRACT

Surgical margin clearance in a cancer is a critical factor which decides the local recurrence and overall survival rate. A quick and accurate intra-operative diagnostic procedure can make a significant difference to survival rate. Touch Imprint Cytology (TIC) has commonly been used from the past in diagnosis of tumours, detection of sentinel lymph node metastasis and has been applied routinely to margin analysis of breast lumpectomy specimens with good success rate. We aim to briefly review the various fields of application of this novel method, like its advent in surgical margin assessment in head and neck malignancies and also elaborate on the technique of performing TIC along with its limitations.

### KEYWORDS :

#### INTRODUCTION

The 'adequate surgical margin' has always remained an enigma in the minds of oncosurgeons worldwide. The most accepted definition of a close margin is a width of 5 mm or less', though other authors have defined it in other ways.

Rapid intraoperative diagnosis usually requires frozen sections, which are expensive, labor intensive, technically challenging and require special equipment and experienced pathologists.

Touch imprint cytology is a valuable tool in Surgical Oncology. It has been used in Neuropathology for many years and more recently it has been receiving increased attention in other areas of Pathology.<sup>2</sup> Examination of cytology specimens obtained by touch preparation of the fresh specimen can add a great deal of information to the frozen sections, and sometimes obviates the need for them altogether.<sup>3</sup> Touch imprint cytology (TIC) offers sensitivity and specificity that is equivalent to that of frozen sections. TIC preserves the original sample for permanent fixation and avoids potential sample loss, which is virtually impossible with frozen sectioning.<sup>4</sup>

The simplicity, speed and cost effectiveness along with its ability to maximize cell recovery from very small tissue piece makes Touch Imprint Cytology a valuable resource for virtually every aspect of experimental and diagnostic medicine.<sup>5</sup>

#### INDICATIONS AND APPLICATIONS OF TOUCH IMPRINT CYTOLOGY

Touch Imprint Cytology has proven its accuracy in diagnosing surgical specimens belonging to thyroid, parathyroid, breast cancer margins, sentinel lymph nodes and prostate gland.

Rudolf Aust et al analysed 1000 cases of cancers of head and neck region. They showed that it was a more rapid and reliable method than frozen sections.<sup>6</sup>

Hussein et al conducted a study on 30 patients to assess the utility of intra operative TIC in diagnosis of 30 head and neck masses. Their results indicated that TIC proved useful in evaluating head and neck mass lesions.<sup>7</sup>

Latifa Ghandur-Mnaymneh et al conducted a study on 300 lymph

nodes which were submitted for the intraoperative diagnosis of metastatic disease by use of TIC, frozen section and permanent section. They concluded that TIC can be used instead of frozen section in cancer staging procedure where many lymph nodes are submitted for immediate intra operative examination for the determination of extent of surgery.<sup>8</sup>

Akhtar Z M et al conducted a descriptive study on 40 cases of breast lesions to determine the accuracy of TIC as an intra-operative diagnostic procedure. They concluded that TIC is an accurate and simple intra operative method for diagnosing breast lesions.<sup>9</sup>

Mariano Llatjos et al conducted a study on 76 patients with T2 breast carcinoma after undergoing successful sentinel lymph node biopsy. They concluded that their study demonstrated an accuracy of TIC that is high enough to warrant its use for intra operative sentinel node assessment.<sup>10</sup>

Peter F Hahn et al conducted a study to evaluate the TIC for obtaining rapid interpretation. They reported TIC were equivalent in diagnostic yield to FNAC, demonstrating similar cellular features. They concluded that TIC offered rapid diagnosis.<sup>11</sup>

Vinod B Shidham et al conducted a study on 177 fresh, unfixed intraoperative specimens during parathyroidectomy. They concluded that TIC is a valuable adjunct to FS during intraoperative consultation for evaluation of tissue in a parathyroid region.<sup>12</sup>

#### TECHNIQUE FOR TISSUE IMPRINT CYTOLOGY

Specimens are collected in the operation theatre. Immediately after excision, the resected tumour margin or lymph node are placed in a sterile rectangular tray. Before placing it in fixative, specimen is washed in slow running water. Orientation of the specimen is done by the surgeon intra operatively. Glass slides are labelled to correspond with the margins of interest. Adequate amount of tissues are excised from different areas of the margin. Each tissue is blotted lightly. The touch imprints are made by gently pressing the corresponding tissue to the glass slide, avoiding a gliding movement, which could distort the shape of the cells.

#### INTERPRETATION OF THE MARGINS

TIC smears were graded using the criteria of Tsou et al. (2006) as follows:

- (1) **Negative**, no evidence of malignancy;
- (2) **Suspicious for malignancy**, suggestive of cancer, but uncertain due to limited number of cells or to degree of atypia;
- (3) **Positive for malignancy**, cellular findings are diagnostic of malignancy and include clustered tumor cells with overlapping nuclei and prominent nucleoli, irregular nuclear outlines with marked pleomorphism, nucleoli frequently large and eccentric;
- (4) **Inadequate specimen**, included too few cells on slides and/or technical failure to obtain diagnosable imprints, e.g., bloody or thick smears.

#### LIMITATIONS OF TOUCH IMPRINT CYTOLOGY

Tsou et al reported that the mitotic figures in TIC smears are few or absent, because they tended to rupture during imprinting.<sup>13</sup> It does not provide architectural information and it cannot distinguish between in situ and invasive lesions, hence emphasizing the need of Frozen Section or Histopathological examinations in cases where invasion is the sole criteria to define carcinoma.

#### CONCLUSION

The Touch Imprint Cytology is simple, rapid and does not require sophisticated instruments. TIC is a simple technique; it requires only fixation and rapid H & E staining. The smears show almost perfect concordance in majority of the neoplastic lesions and hence can be used routinely as an adjunct to histopathology. TIC has further advantage of being inexpensive, simple and quicker than frozen section. In spite of its certain defined limitations, TIC finds a valuable role in the current scenario because of its ease and cost effectiveness.

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