RESEARCH ARTICLE

STUDY OF IMPRINT SMEARS OF VARIOUS LESIONS WITH HISTOLOGICAL CORRELATION

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ABSTRACT
Background: Imprint smear is simple and rapid technique for tissue diagnosis. Imprint is a touch preparation in which tissue is touched on the slide and it leaves behind its imprint in the form of cells on glass slide; studies are made after proper staining.
Aims & Objective: (1) To evaluate utility of imprint smears as diagnostic modality; (2) To study the merits and pitfalls of imprint smears techniques in the diagnosis; (3) To correlate the findings of imprint smears with histopathological findings.
Materials and Methods: This was a prospective study of 100 surgical specimens submitted in Department of Pathology, MGM Medical College, Indore. Smears obtained were stained with Papanicolaou Stain & studied.
Results: Out of total 35 benign lesions, 32(91.4%) were diagnosed correctly and 03(8.6) was false negative. Out of total 65 malignant lesions 58 (89.2%) were diagnosed correctly, 07 (10.8%) were false negative.
Conclusion: Imprint smear is rapid technique for diagnosis & can be utilized for adjuvant to histological diagnosis.
Key Words: Imprint; Cytology; All Lesions; Histological Correlation

Introduction

Origin of cytology dates back more than a century, for over 100 years the discipline of anatomical pathology has centred on diagnostic histopathology. Imprint cytology is simple and rapid technique for tissue diagnosis. Imprint is a touch preparation in which tissue is touched on the slide and it leaves behind its imprint in the form of cells on glass slide; studies are made after proper staining. Diagnostic cytology is the science of interpretation of cells derived from human body, which either exfoliates freely from epithelial surface or removed from various sources by artificial means.[1-4]

A correct diagnosis helps in starting the specific therapy in time, thus reducing morbidity and mortality. FNA, imprint cytology are now rapid diagnostic tool in the armamentarium of clinicians.[5-7] Probably the most influential person in the development of modern clinical cytology was George Papanicolaou.[8] The relative ease (for the surgeon and the pathologist) of collecting a surgical biopsy specimen and the fear that cytology might result in a false-positive or false-negative result caused it to be viewed with extreme skepticism. This study is undertaken with the aim that imprints and scrape cytology is a rapid, simple and easy technique for tissue diagnosis. This is an accurate diagnostic tool available to all practicing surgeon even in small hospitals and semi urban hospitals

Aims of the study: (1) To evaluate utility of imprint smears as diagnostic modality; (2) To study the merits and pitfalls of imprint smears techniques in the diagnosis; (3) To correlate the findings of imprint smears with histopathological findings.

Materials and Methods

The present work was carried out on various surgical specimens submitted in Department of Pathology, Mahatma Gandhi Memorial Medical College, Indore (MP).

Materials required were (i) New blade; (ii) Clear glass slides; (iii) Glass marking pencil; (iv) 95% alcohol; (v) Dry gauze / cotton. In each case we made a naked eye diagnosis from examination of the excised specimen before examining imprint cytology, after surgical removal, the lump was thoroughly inspected and palpated first as such and then it was bisected. A diagnosis of it being benign or malignant was recorded.

Technique for imprint smear: The imprints were prepared according to technique described by Tribe (1973)[2]: (i) Slides properly labelled by glass marking pencil. (ii) After sectioning, the areas suggestive of disease were gently touched with dry gauze to remove blood on the surface. (iii) Slide were then gently touched on the freshly cut surface of the specimen, avoiding a gliding movement. Pressure applied for imprinting varied with the consistency of the specimen. (iv) Smears were quickly fixed in 95% alcohol in order to avoid air drying artefact and stained with a variant of Papanicolaou's-stain.[8,10]

Screening of Smear: Screening was done under low power of microscope and appropriate areas were seen under high power for malignant and other changes

Paraffin blocks were made accordingly. The sections were cut on microtome. The routine haematoxylin and eosin staining was used for histopathological study of the specimens.

Results

Out of total 35 benign lesions, 32 (91.4%) were diagnosed correctly and 3 (8.6%) were false negative. Out of 7 breast lesions, 6 (80%) were diagnosed correctly and 1 (20%) were false negative. In 7 female genital tract lesions, 6 (85.7%) were diagnosed correctly and 1 (14.28%) did not correlated with histology. In 8 male genital tract lesion all correlated well. Out of 6 thyroid lesions 6 (100%) were diagnosed correctly. Out of 5 soft tissue lesions 4 (80%) were diagnosed correctly and 1 (20%) was false negative. All the lesions of salivary gland and kidney were diagnosed correctly. Out of total 65 malignant lesions 58 (89.2%) were diagnosed correctly, 7 (10.8%) were false negative. In breast out of 22, 21 (95.5%) were diagnosed properly and 1 (14.5%) were false negative. In female genital tract out of 7 malignant lesions, 6 (85.7%) were diagnosed correctly. Out of 04 male genital tract malignant lesions included all were diagnosed correctly. Out of 6 gastrointestinal tract lesions, 4 (75%) were diagnosed correctly where as other 2 (25%) were false negative. Out of 7 soft tissue malignant lesions, 6 (85.7%) were correctly diagnosed and 1 (14.28%) were false negative. Out of 2 thyroid lesions 2 (100%) were diagnosed correctly. Out of 4 intraocular mass all 4 (100%) correlated well. Out of 2 malignant kidney lesions, 2 (100%) were diagnosed correctly.

Out of 8 oral lesions 7 (87.5%) were diagnosed correctly and 1 (12.5%) were false negative. In 3 miscellaneous cases 2 (66.7%) diagnosed correctly and 1 (33.7%) were false negative. In the present study out of 100 lesions, 90 were correctly diagnosed and accuracy was 90%.

Table-1: Diagnostic accuracy in different studies

Study	Year	Accuracy (%)
Lee [9]	1982	92.9
Sidham et al [13]	1984	98.4
Bobhate et al [16]	1990	94.9
Khanna et al [7]	1991	98.4
Thilak et al [18]	1995	92.3
Sharma P et al [12]	1997	98.0
Bal et al [1]	2000	96.0
Geeta kashyap et al [5]	2004	91.0
Tushar et al [19]	2005	89.55
Present study		90.00

Discussion

In the present study accuracy in the benign lesions was more than the malignant lesions. Similar to study of Lee (1982)[9] including Tushar et all[19] (2005) found higher accuracy in benign lesions. The imprints from benign lesions were found to be normocellular and a few were hypocellular as well. Similar observations were made by other workers also Dudgeon and Barrette (1934)[3], Tribe (1973)[2], Solanki et al (1977)[15], Helpap et al (1978)[6], Suen et al (1985)[17].

In benign conditions the cells appeared in clusters but were readily identifiable and diagnosed correctly. Dual cytological preparations from phylloides tumor was diagnosed as false positive whereas all the cases of fibroadenoma were diagnosed correctly in contrary to studies of Dudgeon and Patrick (1927)[4] in three cases, Dudgeon and Barrette (1934)[3] in 4 cases, Mouriquand and Dergent (1957)[11] in 2 cases, Tribe (1973)[2] in one case and Helpap et al (1975)[6] in 4 cases.

Imprint from malignant lesions required less pressure and smears were hypercellular than benign lesions. Exceptions to this generalization were found in fibroadenoma, it required less pressure for imprinting and also the imprints were more cellular than other benign imprints. Similar observation have been reported by Dudgeon and Patrick (1927)[4], Dudgeon and Barrett (1934)[4], Solanki et at (1977)[15], Suen et al (1978)[17], Helpap et al (1978)[6], Singh et al (1982)[19].

Mitotic figures though less in number in imprint and scrape smear as compared to corresponding paraffin section malignant lesions. These things were also noticed by Tribe (1973)[2], Singh et at (1982)[14]. Tribe (1973)[2] hypothesized that cells in mitosis tend to rupture during imprinting. Considering the accuracy observed by different workers with our findings suggest, that if imprint and scrape smear are employed as adjuvant to histopathological study, it will be extremely useful in arriving the correct diagnosis. There are some points to improve the accuracy noticed by Dudgeon and Barrette (1934)[3], Tribe (1973)[2], Amarjeet Singh et al (1982)[14]:

- The tissue surface to be imprinted should be flat and there should be no portion of fat protruding from the edges as these tend to smudge the imprints.
- Sometimes the first imprint contained excess tissue fluid and blood and it was found that subsequent imprints gave better cytological results and third smear was found to be the best.
- The case with which any tumor gets imprinted varies

considerably. In order to obtain imprint nearest to one cell thickness, the amount of pressure applied at the time of imprinting therefore varied. Benign looking lesions usually required more pressure in order to obtain sufficient cells for diagnosis while malignant tumors get imprinted more easily.

Benign

Accuracy of imprint in various benign lesions was 91%. According to various organs breast constitute 80% accuracy and female genital tract constitute 85.7% accuracy, 100% accuracy in thyroid lesions. 100% accuracy in male genital tract 1 case of soft tissue lesion (traumatic neuroma) was false negative; there was one false positive case that was of phylloides tumor.

Malignant

Accuracy of imprint in various malignant lesions was 89.2%. According to various organs breast constitute 95.5% accuracy and female genital tract constitute 85.7% accuracy, 100% accuracy in thyroid lesions, soft tissue constituted 85.7% accuracy, intraocular lesions had accuracy of 100%, 1 case of male genital tract that was prostatic intraepithelial neoplasia was diagnosed benign whereas GI tract lesions showed diagnostic accuracy 75%. No false positive was diagnosed. Geeta Kashyap (2004)[5] concluded that there was 91% diagnostic accuracy in ocular lesions where as our study showed diagnostic accuracy of 100%. Tushar et al (2005)[19] concluded that there was diagnostic accuracy of 75.9% in malignant ovarian lesions but in our study there was accuracy of 75% only. Tsou H et al (2006)[20] study on nasopharyngeal carcinoma was performed which had diagnostic accuracy of 89.8% where as our study showed diagnostic accuracy of 87.5% in all oral lesions including laryngopharynx.

Conclusion

There is some drawback also regarding imprint smears. They are not reliable for providing information on the depth of infiltration of tumor although it might provide information on the original site of tumor. Despite these drawbacks it is concluded that imprint and scrape cytology is simple, fast, easy and reliable technique for the diagnosis of tumor. It has wide applicability in the rapid diagnosis of tumors of various body organs.

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