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Comparative Study of FNAC and Imprint Cytology with Histopathology in General Surgical Tumours.

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ABSTRACT

Background: Fine needle aspiration cytology (FNAC) is routinely being used for the diagnosis of various neoplastic and non-neoplastic lesions and for both superficial and deep seated lesions. Although FNAC has been used extensively in the diagnosis of head and neck masses, its use is underutilized as far as intraoral lesions are concerned. AIM: To assess the role of Fine Needle Aspiration Cytology and Imprint Cytology in the diagnosis of common general surgical tumors. **Methods:** A prospective study of 147 patients of any age group, was carried out in Department of surgery in Tirunelveli medical college. Patients who are all presenting with general surgical tumors were assessed regardless of the age, size of the tumor and location of the tumor. **Results:** In the comparative study of FNAC and Imprint cytology with histopathology, the diagnostic accuracy to benign and malignant tumors was assessed. Out of the total 147 cases, 80 cases were benign and 67 were malignant. The diagnostic accuracy for imprint cytology amounts to 95% for benign and 93% for malignant lesions and for FNAC it is 81% and 79% for benign and malignant respectively. **Conclusion:** FNAC and Imprint cytology are rapid and reliable diagnostic indicators and helps to decide the mode of treatment. FNAC aids in arriving at a definite pre-operative diagnosis for tumors eliminating the need for open biopsy, whereas imprint cytology has a tremendous impact in the intraoperative diagnosis and planning especially in centers where frozen section is not available.

Keywords: FNAC, Imprint cytology, benign, malignant tumour.

INTRODUCTION

"In the appearance of a cell from cancer there is nothing characteristic of the disease, nothing that would lead a pathologist to identify it as a malignant cell. Cancer can only be identified in sections showing the relation of cells to each other in group".[1] This view endorsed in favor of biopsy in 1922 and expressed by Bland Sutton is no more the raison d'etre for a pathologist.[2] Though HPE is considered to be the final arbitrator of the diagnosis a coup de maitre, with the advent of and increased expertise in cytomorphological studies it doesn't form the coup de grace. Cytomorphological studies contemporarily are accepted as reliable, safe and rapid procedures for a wide variety of lesions &observation by various workers unequivocally has demonstrated that reliability of cytodiagnosis is as much as that of conventional HPE & there exists a remarkable correlation between the two methods in arriving at the diagnosis. Cytomorphology incorporates FNAC & Imprint Cytology and though (both involves the study of cellular morphology) the harvest reaped in both are cells, there is one substantial difference between the two. Former is a closed procedure as compared to the latter which is possible only when the lesion is open. At first glance, Imprint cytology appears redundant since open biopsy yields tissue for HPE study. However careful scrutiny reveals certain distinctive advantages of Imprint Cytology study. Due to excellent cellular details, simplicity, speed and sufficient cellular yield with preservation to some extent of histological pattern of imprint tissues, Imprint Cytology not only forms and an adjuvant to HPE, It has tremendous positive implication in frozen section, if not superior to it. Thus, once a FNAC report makes it mandatory to opt for an open biopsy, Imprint Cytology forms a major corroborator not only for an intraoperative diagnosis but also during routine post-operative histopathology reporting.[3] FNAC & Imprint Cytology form the rapid tools in the diagnostic armamentarium of surgeons and pathologists.[4]

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Aim

To assess the role of Fine Needle Aspiration Cytology and Imprint Cytology in the diagnosis of common general surgical tumors.

MATERIALS AND METHODS

This prospective study was conducted in Department of Surgery, Tirunelveli Medical College Hospital. All patients presenting with general surgical tumors for which FNAC is indicated are subjected to FNAC. For whom FNAC warrants medical lines of management are given medical treatment and are excluded from the study. Those who required open biopsy were subjected to surgery and at the same time multiple cut sections were made and imprints were taken which were later stained by hematoxylin and eosin and were reported by pathologist. The FNAC, Imprint cytology and histopathology reports were compared and analyzed in this study.

RESULTS

A total of 147 cases were taken up for comparative study of FNAC and Imprint cytology with histopathology. Of the 147 cases 45 cases were breast lumps, 42 cases were thyroid lesions, 40 cases were lymph node lesions and remaining 20 cases were miscellaneous general surgical lesions like squamous cell carcinoma of different sites, melanoma and pleomorphic adenoma. Out of the45 breast lesions 22 cases were benign and 23 cases were malignant. All the 22 benign cases were reported as benign by Imprint cytology and 21 cases were reported benign by FNAC. One case of breast abscess was acellular. Of the 2 cases of phylloides tumour both were reported as phylloides tumour by Imprint, whereas, by FNAC one was reported as phylloides tumour and the other as fibrocystic disease. 2 cases of Gynecomastia are concordant with Imprint and FNAC. Of the 23 cases confirmed malignant by histopathology, all the 23 cases were reported malignant by Imprint Cytology and 21 cases were reported malignant by FNAC. One was an acellular smear and another was reported as florid epitheliosis. Out of 42 Thyroid lesions compared, 38 cases were benign and 4 cases were malignant. Of the 14 cases of Nodular goiter 13 cases were reported by Imprint as Nodular goiter and one was reported as Colloid goiter. 13 cases were reported as Nodular by FNAC and 1 was reported as Colloid goiter. Of the 8 cases of Colloid goiter reported by histopathology and Imprint, 6 were reported as Colloid and 2 as cystic lesion by FNAC. Of the 3 cases of Hashimotos Thyroiditis, all 3 were diagnosed by Imprint whereas FNAC report was Follicular Neoplasm, Colloid goiter with lymphocytic infiltration and Nodular goiter. Of 3 cases of Thyroglossal cyst all 3 were picked up by imprint and only 2 were picked up FNAC and the third was reported as Hurthle call neoplasm. Of the 9 follicular adenomas confirmed by histopathology all the 9 were diagnosed by Imprint and 8 were reported as follicular neoplasm in FNAC and 1 was reported as Colloid goiter. In FNAC 3 cases false negatively reported as follicular neoplasm turned out to be anaplastic carcinoma, papillary carcinoma and Hashimotos thyroiditis. 4 cases were confirmed malignant by histopathology, 3 cases were picked up by imprint cytology. Of the 2 cases of papillary carcinoma 1 was picked up by both FNAC and imprint Cytology whereas the second was reported as false negatively reported as adenomatous hyperplasia in imprint cytology and follicular neoplasm in FNAC. A case of anaplastic carcinoma was reported as anaplastic in imprint and follicular neoplasm in FNAC. A case of follicular carcinoma was reported as follicular neoplasm in FNAC and follicular carcinoma in imprint. Out of 40 lymph nodes examined 16 were benign and 24 were malignant. Of the 16 benign nodes 11 were reactive nodes and 5 were tuberculous nodes. FNAC picked up 3 tuberculous nodes and other 2 were reported as reactive nodes. Imprint could pick up only 2 cases and the other 3 were acellular smears. Out of the 24 malignant nodes, 23 were detected by Imprint and 1 was acellular. 18 cases were detected by FNAC. All the secondary deposits except one acellular smear were picked up by Imprint and 1 was reported as reactive node by FNAC. Of the 11 axillary nodes of carcinoma breast patients examined 10 had Metastatic deposits which were picked up both by FNAC and Imprint. Of 6 other nodes with secondary deposits 5 were picked up by imprint 1 was acellular and 5 were picked up by FNAC, 1 was reactive node. Out of the 7 lymphomas confirmed by histopathology 3 were reported as lymphomas and 4 were reported as suggestive of lymphoma by imprint, whereas only 3 cases were picked up by FNAC. Out of the 12 squamous cell carcinoma of different sites confirmed by histopathology imprint picked up all the 12 whereas FNAC picked up 11 cases. 2 cases of benign tumour of parotid were diagnosed by imprint and only one by FNAC and the other was reported as acellular smear. Out of the 2 cases of soft tissue sarcoma one was diagnosed by FNAC and both were acellular in imprint. A case of branchial cyst was reported as branchial cyst both in FNAC and imprint Cytology. Out of the total 147 cases, 80 cases were benign and 67 were malignant. The imprint cytology has an overall diagnostic accuracy of 94.9% for benign and 92.5% for malignant lesions. FNAC has an overall diagnostic accuracy of 84% for benign and 81% for malignant lesions.

DISCUSSION

In Breast diseases according to this study imprint Cytology has a diagnostic accuracy of 100% for both benign and malignant lesions, Whereas, FNAC has a diagnostic accuracy of 95% and 91% for benign and malignant lesions. The pale yellow or light green fluid tends to be benign whereas blood tinged or

turbid fluid may reflect a serious lesion and should always be subjected for cytological examinations. Increased stromal cellularity and atypia indicate phylloidestumour7which may not be picked up by FNAC. This may be the reason why a case of phyllo ides tumour was reported as fibrocystic disease. FNAC can't reliably distinguish between invasive ductal carcinoma and intraductal carcinoma.[8] In a recent study by Andrew JC et al10 in intraoperative evaluation of lumpectomy margins by Imprint Cytology and Histopathology revealed Imprint Cytology as a simple, rapid, accurate and cost effective method for determining intraoperative margin status. In Thyroid diseases, 3 cases of Hashimotos Thyroiditis were reported as follicular neoplasm, colloid goiter with Lymphocytic infiltration, and nodular goiter in FNAC, whereas, in Imprint Cytology they could be diagnosed as Hashimotos. Oxyphil cells in thyroiditis may be very pleomorphic. Disorganized poorly cohesive masses of oxyphil cells with prominent nucleoli are more indicative of neoplasm and sheet like structures with infiltration by Iymphocyter indicate hyperplasia. In FNAC architecture could not be studied and hence the error. In Hurthle cell adenoma, the pattern of growth is follicular in most cases, less frequently it is solid and trabecular and rarely it is papillary. By FNAC it is not possible to distinguish between a follicular adenoma and follicular carcinoma (although it is possible to identify the process as neoplastic). But most non-neoplastic nodules, thyroiditis, papillary carcinoma, medullary carcinoma and anaplastic carcinoma can be identified. Follicular adenoma is defined by WHO as "a benign encapsulated tumour showing evidence of follicular cell differentiation".[11] Imprint scores over FNAC in follicular neoplasm due to better preservation of architecture, follicular adenoma and carcinoma could be differentiated in the light of a good clinical history. A case of papillary carcinoma reported as adenomatous hyperplasia in imprint cytology and follicular neoplasm in FNAC may be due to non-representativeness of this sample. In a recent study by Pluot M et al in the correlation of imprint cytology and FNAC in the diagnosis of tumours of the thyroid had proved the specificity of imprint cytology to be greater than that of FNAC.[12] They have stated that imprint cytology provides enough cells to perform special techniques, quantitative cytology that is useful for the diagnosis of some tumour varieties. (Follicular tumours). In lymph node lesions detection of primary lymphomas by imprint achieves 100% though the exact type could not be made out. By FNAC it is less than 50%. The secondary deposits detection by imprint and FNAC are 94% each. In the benign lesions only 5 tuberculous nodes could be compared because once diagnosed as TB adenitis in FNAC the patients are given ATT and are not further subjected to open biopsy. Out of the 5 only 2 were picked up by imprint and 3 by FNAC. This may be due to abundant caseous material with few epitheloid cells which makes the imprinting and interpretation difficult. In lymph node lesions FNAC and imprint are useful in diagnosing metastatic neoplasm, rendering primary diagnosis of lymphoma in selected cases in documenting evolution of low grade lymphoma to high grade, in diagnosing nonspecific and certain specific lymphadenitis. Benign lymphoid hyperplasia can mimic malignant lymphomas and vice versa (e.g) benign proliferation of large transformed lymphocytes may be misinterpreted as malignant lymphoma and conversely low grade NHL resembles reactive lymph node hyperplasia. In cytology low grade NHL can't be distinguished from benign lymph node. 905 of high grade NHL are identified correctly. When imprint cytology is combined with immunohistochemistry the exact typing of lymphomas and metastatic diseases can be diagnosed more accurately. In metastatic disease FNAC and imprint scores well in accuracy. In 1952, Dearing reported from Newcastle, the use of smear to determine metastasis in lymph node by scrapings from cut nodes, fixing in Carnoy's solution and rapid staining with Papanicolaou stain. In 219 smears-98.6% correct diagnosis were made. In our study the diagnostic accuracy amounts to 94%. A study by K. Motomura et al on intraoperative sentinel lymph node examination by imprint cytology and frozen sectioning during breast surgery has concluded that the sensitivity of frozen section was almost equivalent to that of imprint cytology.[13] In malignant Breast lesions there were no false negatives in imprint Cytology whereas there were two false negatives in FNAC. In malignant Thyroid lesions, there were two false negatives in FNAC and one false negative for Lymphoma in imprint cytology and there were four false negatives in FNAC. For secondary deposits, there was one false negative reporting in FNAC and imprint Cytology.

CONCLUSION

The diagnostic accuracy for imprint cytology amounts to 95% for benign and 93% for malignant lesions and for FNAC its 81% and 79% for benign and malignant respectively. When FNAC and imprint were taken together the diagnostic accuracy for breast lesions amount to 100%, 95% for Thyroid lesions and 95% for Lymph node lesions. The false negative reporting were higher in FNAC than imprint Cytology. FNAC aids in arriving at a definite preoperative diagnosis for tumours eliminating the need for open biopsy. Imprint cytology has a tremendous impact in the intraoperative diagnosis and planning especially in centers were frozen section is not available. To conclude FNAC and imprint cytology are rapid and

reliable diagnostic indicators in the armamentarium of the pathologist and the Surgeon.

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