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Cytodiagnosis and Cytomorphological Spectrum of Cutaneous and Subcutaneous Lesions in a Tertiary Care Hospital in Eastern India

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Abstract: ***Objective:*** *FNAC is a safe, rapid and useful procedure for detection and confirmation of palpable cutaneous and subcutaneous lesions which can arise due to a variety of conditions including inflammatory, neoplastic or metastatic from a primary site. The present study was carried out with the objective of studying the efficacy of FNAC in cytomorphological spectrum of common as well as some uncommon cutaneous lesions and in rapid detection of these cases.* ***Methods****: A total of 180 cases of cutaneous and subcutaneous lesions in the year 2017 were reviewed retrospectively from cytology files. Cytologically proven different organic lesions including lymph nodes have been excluded from the present study .****Results****: Majority of cases comprised of epidermal cysts, ganglion, lipomas, cold abscess, vascular lesions and benign mesenchymal lesions. Unusual cases included fungal infection, adnexal neoplasm, meningioma and malignant conditions both primary and metastatic such as cutaneous lymphoma ,deposit of renal cell carcinoma and deposit of mucinous carcinoma . These cases were correlated with relevant history and other available investigations.****Conclusion :****FNAC is cost effective and plays an efficient role in rapid diagnosis of cutaneous and subcutaneous lesions and as such is very important in the management of these cases ,avoiding unnecessary surgical intervention in many of them.*

Keywords: *Cutaneous lesions, Subcutaneous lesions, FNAC, Cytodiagnosis.*

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I. Introduction

Palpable cutaneous and subcutaneous lesions can arise due to a variety of conditions including inflammatory, neoplastic or metastasis from a primary malignant lesion. Fine needle aspiration cytology (FNAC) is a safe, rapid, inexpensive and relatively non-traumatic procedure which is well tolerated by the patients. It is an useful tool for sampling and diagnosis of clinically similar palpable cutaneous and subcutaneous lesions. Multiple samples can be obtained in the same sitting.

Practicing FNAC (fine needle aspiration cytology) on palpable has advantages to patients and clinicians as it is painless, inexpensive and rapid OPD based procedure [1]. It can be performed on any part of body or tissue. We can do multiple sampling from different parts of large heterogeneous lesions without complication. By using rapid staining procedures, a preliminary diagnosis can be made within short time and surgery can be avoided if lesion proves to be non- neoplastic and self limiting. In the cases of metastatic malignancy it allows pre-operative staging and planning of the extent of surgery. So FNAC gains its place in clinical protocol for pre-treatment diagnosis of lesions whether inflammatory, benign or malignant(11).

Metastatic cutaneous or subcutaneous deposit may rarely be the first clinical manifestation leading to recognition of the underlying condition .Skin metastases are believed to be due to systemic spread and they represent terminal stage of malignant disease with limited survival period(7). As an alternative to performing biopsies, fine needle aspiration cytology (FNAC) is a minimally invasive method, that can be used to diagnose these cases.

II. Aims And Objectives

The objective of our study was to evaluate the efficacy of FNAC in rapid detection of cytomorphological pattern of common as well as some uncommon cutaneous-subcutaneous lesions in rapid detection of cases in patients attending FNAC clinic at the Department of Pathology , N.R.S.M,C.&H . The study also aims at correlating the clinical, cytomorphological and histopathological findings in various palpable cutaneous and subcutaneous lesions.

III. Materials And Methods

This study was performed in the Department of Pathology of N.R.S.M.C &H. and was carried out from March 2017 to February 2018. All the palpable cutaneous and subcutaneous nodules were included in the study. Organic lesions including lymph nodes, salivary glands, thyroid and breast have been excluded from the study. The cases were correlated with relevant history, physical examination findings and other available investigations. FNAC was performed using 23 gauge needle and 10 ml sterile syringe. Some of the FNAC smears were air dried for Leishman-Giemsa stain and others fixed in 95% ethanol and stained with Papanicolaou (PAP) stain and mounted in DPX & cover slipped . Special stains like ZN stain and PAS stain were employed where required. The smears were studied under light microscope. Histopathological correlation was done in most of the cases although some patients were lost during follow up. The histopathological sections were stained with haematoxylin and eosin stains. Parameters to be studied were Clinical History, FNAC examination **,** Laboratory investigations **,** Treatment records .A detail history in terms of duration of swelling , multicentricity, associated symptoms & any treatment . History of Diabetes ,Hypertension & any malignancies were also noted.

IV. Observations

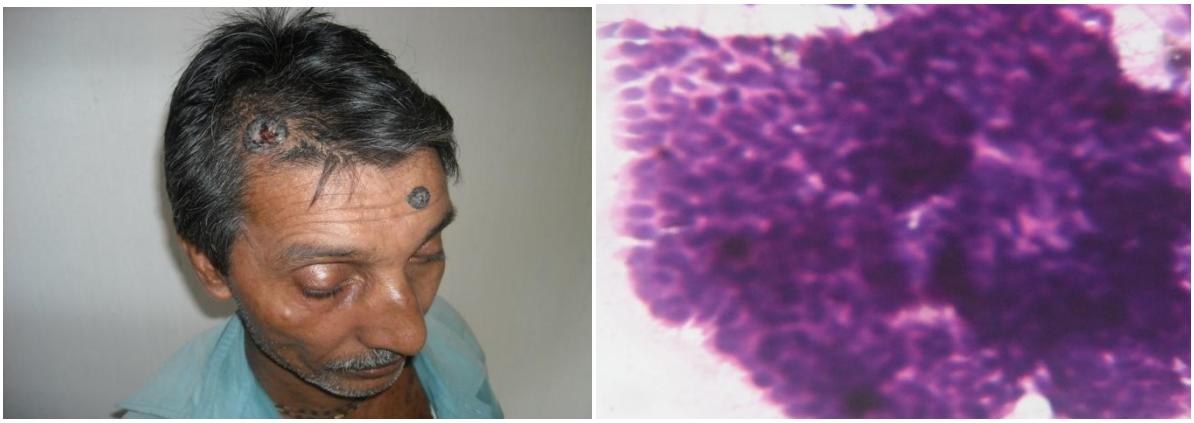


Fig1(A)55 years Male with ulceroproliferative growth in the scalp that was increasing in size for last 10 years along with a pigmented lesion over forehead present for last 7 years (B)Tight cell aggregates with palisading of nuclei along the edge of the aggregates . Medium sized cells with scanty cytoplasm ,indistinct cell borders, hyperchromatic ovoid nuclei, indistinct nucleoli and variable stromal material.

TABLE-1. Distribution of study subjects according to age available in 180 cases. The cytological findings were as follows:

SL NO.	Categories	Number of cases	% of cases	Specific subtypes
1	**Inflammatory non-neoplastic lesions**	18	10	Suppurative lesions(8), Inflammatory granulation tissue(3), Mycobacterial infection(4), Nonspecific granulomatous lesion(2), Fungal infection(1)
3	**Cysts and other non-neoplastic lesions**	84	46.7	Epidermal cyst(48), Ganglion(16), Bursal cyst(2), Vascular lesions/Malformation(16), Lymphocele(1), Endometriosis(1)
4	**Benign Epithelial and adnexal tumors**	4	2.2	Benign adnexal tumor -non-specified(3),Pilomatrixoma(1)
5	**Malignant epithelial tumors**	5	2.8	Squamous cell carcinoma(3), Basal cell carcinoma(2)
6	**Benign non-epithelial lesions**	56	31.1	Subcutaneous lipoma(31), Benign mesenchymal/spindle cell tumor (non-specified)(7), Benign peripheral nerve sheath tumor(4), Haemangioma(4), Lymphangioma(5), Giant cell tumor of tendon sheath(1), Nodular fasciitis(2), Langerhan cell histiocytosis(1), Subcutaneous meningioma(1)
7	**Malignant non-epithelial tumors and tumour like conditions**	5	2.8	Malignant melanoma(1), Dermatofibrosarcoma protruberans (DFSP)(1), Malignant spindle cell tumor :non-specified(3)
8	**Metastatic malignancy**	8	4.4	Ductal carcinoma breast(2), Small round cell tumor(2),Renal cell carcinoma(1), Small cell carcinoma lung(1),Squamous cell carcinoma :oral cavity(1).Mucinous carcinoma of gut .(1)

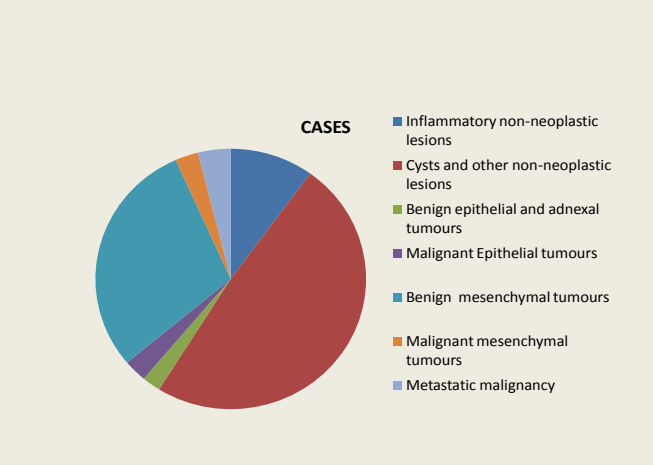
Fig 2 (A)48 years Male with a gradually increasing painless, subcutaneous swelling in chest for 2 months.O/E the swelling was soft to firm in consistency and size 2cmX2cm. (B) FNAC finding: Cellular smear showing large number of single cells and clusters of poorly cohesive cells .Round hyperchromatic nuclei with anisokaryosis, macronucleoli(high grade tumour).Abundant cytoplasm that is finely granular .

Table2: Tumours of different categories

Type	Epithelial	Mesenchymal	Total
Benign	**4**	**56**	**60(86%)**
Malignant	**5**	**5**	**10(14%)**
Total	**9**	**61**	**70(100%)**

Table 3

Age In Years	No. of cases	Percentage
1-10	**9**	**5%**
10-20	**18**	**10%**
20-30	**27**	**15%**
30-40	**18**	**10%**
40-50	**27**	**15%**
50-60	**36**	**20%**
60-70	**27**	**15%**
>70	**18**	**10%**
Total	**180**	**100%**



Pie Chart Showing Relative frequency of cases

TABLE 4

Inflammatory non-neoplastic lesions:

Inflammatory lesions constituted 10% (18) cases. 8 cases were abscess or suppurative lesions showing acute inflammatory cells on a necrotic background. In 3 cases, clusters of reactive fibroblasts, histiocytes, endothelial cells and mixed inflammatory cells were observed and was diagnosed as inflammatory granulation tissue. Cold abscess or mycobacterial infection was diagnosed in 4 cases. Granular eosinophilic caseous necrosis with degenerating and fragmented nuclei was seen. ZN stain revealed acid fast bacilli. 2 cases were nonspecific granulomatous lesions showing multinucleated giant cells and clusters of epithelioid histiocyes. The differential diagnosis included conditions such as foreign body granuloma, tuberculosis, leprosy, sarcoidosis, fungal infection etc. Fungal infection was diagnosed in a 55 years old female with a swelling on the dorsum of foot. Fungal hyphae ,acute inflammatory cells and histiocytes and were identified on a necrotic background.

Cysts and other non-neoplastic lesions:

Cysts and other nonneoplastic lesions constituted 48.9% (84) cases.48 cases were epidermal cysts. Clinically the patients presented with a subcutaneous soft to firm non tender swelling. Aspirate consisted of thick pultaceous foul smelling material. FNAC smears showed anucleate and nucleated mature squamous epithelial cells in a background showing keratinous material. Chronic and acute inflammatory cells, foreign body giant cells and calcification was also observed in different cases. Histology was done in 42 cases. Histologically this group included epidermal cysts, trichilemmal cysts and dermoid cysts. The three types of cysts are cytologically similar but the abrupt transition of basaloid squamous epithelial cells to keratinized globules seen in tissue sections of trichilemmal cysts have also been observed in FNAC smears.[5]

Vascular lesions or malformations including haematoma, arteriovenous malformation etc was diagnosed in 16 cases. Aspirate was altered blood. Smears showed altered RBCs, WBCs, haemosiderin containing macrophages, amorphous material with cholesterol crystals or fragments of granulation tissue depending on the age of the process.

16 cases of ganglion were reported. Clinically the patients presented as well defined firm, cystic swelling around joints most commonly on dorsal carpal region of hand. Patients often presented with pain and weakness of joint. Aspirate revealed characteristic thick, colourless, glassy jelly-like material. FNAC smears show scattered cells with small oval nuclei and ample cytoplasm on a background showing abundant myxoid material. Histopathological correlation was obtained in 9 cases. Histopathological picture was that of a cystic lesion with wall composed of dense fibrous tissue and there was no synovial lining or communication with joint cavity.

Two cases of bursal cysts including a case of Baker's (popliteal) cyst was diagnosed on FNAC. Aspirate was yellowish fluid. Smears showed ganglion cells, cyst macrophages and few chronic inflammatory cells on a fluid background. Histopathology done in one case showed cyst lined by true synovium.

Lymphocele was reported in 1 case. Aspirate was clear, yellowish straw coloured fluid which on smears showed variable number of normal lymphocytes. Endometriosis was the diagnosis in a 40 years old female presenting with an abdominal scar having adjacent tumor-like induration in the subcutaneous tissue. Aspirate was particulate admixed with altered blood. FNAC smears revealed endometrial (columnar) epithelial cells and plump oval to spindle stromal cells along with haemosiderin containing macrophages . Histological examination done showed endometrial glands and stroma embedded in dense fibrous tissue.

Benign Epithelial and adnexal tumors : Cases of Benign adnexal tumor -non-specified(3) and Pilomatrixoma(1) were encountered.(1,9)

Malignant epithelial tumors

Malignancies were mainly seen in older age group comprising of squamous cell carcinoma and basal cell carcinoma (Fig 1). During the period of study there were total 5 malignant epithelial tumour cases and out of which , 3 were male and rest were female. Commonest primary skin malignancy was found to be squamous cell carcinoma (3cases) . Histopathology was available in all the cases and diagnosis was confirmed. Skin primary malignancy and metastasis both can present as a nodular lesion and sometimes with superficial ulceration imposing diagnostic challenge to the clinicians. Diagnosis of the lesion as primary or secondary helps clinicians in staging and subsequent management of the patients. However in cases with overlap, excisional biopsy and immunohistochemistry are needed for further interpretation

Benign non-epithelial tumors and tumour like lesions In neoplastic conditions benign lesion are more common. Lipoma is on the top of the list (31 cases). Along with lipoma other benign lesions included benign mesenchymal/spindle cell tumor (non-specified)(7), Benign peripheral nerve sheath tumor(4), Haemangioma(4), lymphangioma(5), giant cell tumor of tendon sheath(1), nodular fasciitis(2), Langerhan cell histiocytosis(1), subcutaneous meningioma(1). .

Malignant non-epithelial tumors Malignant melanoma(1), Dermatofibrosarcoma protruberans (DFSP)(1), and Malignant spindle cell tumor :non-specified(3) were encountered and subsequently confirmed with biopsy examination.

Metastatic malignancy In our study metastatic deposit of ductal carcinoma of breast were found to be frequent. Metastatic deposits from small round cell tumor(2),renal cell carcinoma(1)(Fig 2), small cell carcinoma lung(1) and squamous cell carcinoma :oral cavity(1) and mucinous carcinoma of gut.(1) were diagnosed. All these cases were confirmed histologically. Cutaneous metastasis is considered a 'grave' sign for majority of the patients with malignancy(7). Development of such lesions may indicate failure of ongoing therapeutics or recurrence of a cancer assumed to have been previously eradicated or, rarely, it may be the first sign of the unsuspected malignancy. Skin metastases usually occur close to the site of primary tumour, that is, chest in lung carcinoma, abdominal wall in gastrointestinal malignancies and lower back in renal carcinomas(7). Incidence of tumours metastasizing to skin correlates with the frequency of occurrence of primary malignant tumours in each gender. Other studies have found lung as the common source of primary in males followed by large intestine, melanoma, renal cell carcinoma and carcinoma of the oral cavity. Breast followed by colon, melanoma, lung, ovary and sarcoma have been found to be more common primaries in females (3,7).

V. Discussion

Skin is a common site to be involved in various neoplastic and non neoplastic conditions. Sometimes inflammatory lesions presented with big mass and mimic a malignant tomour. In such conditions performing a simple FNAC prevents further unnecessary complications(2). Lipoma is the commonest cytologically detected benign tumour. All adnexal tumors could not be categorized on FNAC but in few we can offer a diagnosis(1,8,9). In a similar study by Sharma et al , cutaneous metastases was 0.12% with unknown primary(3). The patients were represented by 12 males and 7 females with age range of 40-85 years (mean 63 years) in males and 1.5-76 years (mean 47.3 years) in females. Most of the studies reported a higher incidence of cutaneous metastasis in males rather than females. Cutaneous metastases are mostly multiple and rarely solitary. However in this study, multiple lesions or multiple site involvement was seen in only 4 cases (21%). Sharma et al reported multiple site involvement in 8 (9%) of the cases(3).

Metastatic lesions should be distinguished from primary adnexal tumours and primary squamous cell carcinoma of the skin. Presence of pools of extracellular mucin, signet cells and three dimensional papillae represent metastases rather than primary in case of adenocarcinoma. Metastases is usually located in the deeper dermis and subcutis and they are free from the overlying skin . Cutaneous metastases presenting as first sign of malignancy commonly seen with cancers of lung, kidney and ovary. In some studies, cases of cutaneous metastases failed to find primary site even after autopsies.

VI. Conclusion

FNAC is cost effective and plays an efficient role in rapid diagnosis of cutaneous and subcutaneous lesions and as such is very important in the management of these cases ,avoiding unnecessary surgical intervention in many of them. Furthermore, FNAC is a very useful procedure in diagnosis of various skin lesions ,offering a supportive diagnosis of metastasis in cases with known primary or giving clue to underlying malignancy in unsuspected cases .

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