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RESEARCH ARTICLE

CYTODIAGNOSIS OF SUBCUTANEOUS NODULES – A STUDY

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ABSTRACT

Cytodiagnosis of subcutaneous nodules are mainly done in the investigation of lesions clinically suspicious of tumour recurrence or metastasis. The FNA in the initial diagnosis as compared to open biopsy is not preferred. We have done a prospective cytopathological study in 142 cases to evaluate the efficacy of FNA in these lesions. The study was done in 142 cases of subcutaneous nodules who had come to Patna Medical College & Hospital (PMCH), Patna and a Private Laboratory situated near PMCH in between December 2010 to November 2012. FNA was done by using 23 gauge needle. The smears were stained by PAP, H&E and air-dried MGG stain and evaluated with clinical & radiological correlation. Cytohistological correlation was done wherever possible. A total number of 142 cases of subcutaneous nodules were aspirated. There were 88 males (62%) and 54 females (38%). Age ranged from 1-68 years. Aspiration done from different sites with maximum from lower extremity 55 (38.7%), followed by chest 26 (18.3%). Out of 142 cases, benign neoplasms were 75 (52.8%), infective were 29 (20.4%), malignant were 21 (14.7%) & cystic lesions were 17 (11.9%). Among the neoplasms, lipoma was the commonest followed by tubercular cold abscess in the infective group.

INTRODUCTION

The staggering run-away success of the FNAC technique is reconfirmed, year after year, by the increasing numbers of aspirates done worldwide and also by growing confidence with which diagnosis of lesions from all organ sites is rendered by now, every possible tissue and organ has been exploited but perhaps the last, and slowest to yield its secrets and reveal its identity is the skin, subcutis and soft tissues. The main indication for fine needle aspiration cytology of tumours and tumour like lesions of subcutis and soft tissues is clinical suspicion of recurrent tumour or metastasis (Layfield *et al*., 1998) (Orell *et al*., 2005) whereas indication for FNA is relative in primary lesions, especially the soft tissue tumours. A pre-operative cytologic diagnosis offers several advantages. It is simple, cost effective and rapid. It is less disruptive to tissue planes for a subsequent excision. Multiple sampling from different parts of large heterogenous lesions is also possible without complications (Akerman *et al.*, 1987). Hospitalization is not necessary and by using rapid staining procedures, a preliminary diagnosis may be rendered within short time of aspiration and thus, patient's anxiety can be relieved by providing an instant diagnosis followed by discussion of therapeutic options at the first visit. Surgery can be avoided if lesion proves to be non-neoplastic; or delayed for convenience if it is benign. A diagnosis of malignancy allows preoperative staging and planning of the extent of surgery. Using FNA, instead of open biopsy, the extent of surgical excision necessary in a radical operation can be reduced. This is because with an open biopsy, seeding of tumour cells to uninvolved tissue may occur (Akerman *et al*., 1994) (Geisinger *et al*., 2001) (Orell *et al*., 2005) (Roy *et al*., 2007). Thus, wider excision margins are required, with risk of unnecessary loss of function. Soft tissue lesions do have their own cytologic identity, hence a diagnosis is possible in many cases (Rekhi *et al*., 2007) (Kumar *et al.*, 2007).

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MATERIALS AND METHODS

The cytopathological study was done in all 142 cases of subcutaneous nodules who have come to our Department in PMCH & a Private Laboratory situated near PMCH in between December 2010 to November 2012. All 142 cases were subjected to fine needle aspiration. Superficial aspirations were performed using an aspiration gun with attached syringe and 23 gauge needle. Local anaesthesia was not given to any of the patients. For deep seated lesions, a needle with a stylet was used to avoid sampling of subcutaneous fat and other tissue surrounding the lesion under image guidance. Multiple aspirations were usually done in each case to obtain sufficient and representative material for cytomorphological diagnosis and the maximum of four passes were made in single case. The smears were alcohol-fixed for papanicolaou stain and H&E staining and air-dried for MGG stain. Wet fixation gave excellent nuclear detail particularly when cells occur mainly in microscopical solid tissue fragments, as usually seen in soft tissue lesions. Air-dried MGG smears highlight cytoplasmic detail. Cytohistological correlation was done, wherever possible.

OBSERVATIONS

A total no. of 142 cases of subcutaneous nodules were subjected to FNAC.

Table 1. Distribution of patient according to site

S. No.	Site	No. of cases
1.	Scalp	15
2.	Nape of the neck	16
3.	Chest	26
4.	Upper extremity	23
5.	Abdomen	7
6.	Lower extremity	55

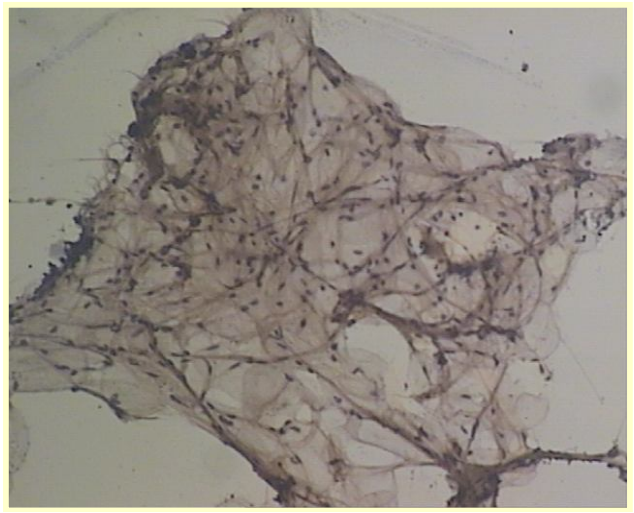
Table 2. Distribution of patients, according to age, sex, cytological typing & cytomorphological diagnosis

S. No.	Cytological diagnosis	Cytological typing	No. of cases	Age	Sex	Salient Cytological features noted
1.	Lipoma	Benign	49	10-65	31M 12F 6C	Mature Adipose tissue trapped in Fibromyxoid tissue
2.	Cold abscess	Infective	26	10-50	10M 14F 2C	Epitheloid granulomas with caeseation & langhans' giant cells
3.	Abscess	Infective	01	18	1M	Numerous polymorphs against exudates
4.	Benign Cystic Lesions					
(a)	Dermoid	Benign	05	20-40	12M	Keratinnized squamous cells multinucleated
(b)	Epidermal inclusion cyst	Benign	07		7F	histiocytes, inflammatory cells and debris
(c)	Sebaceous cyst	Benign	05			
(d)	Ganglion	Benign	02			A few pale histiocytes like cells background of amorphous mucoid material
5.	Foreign body granuloma	Benign	02	30-50	2M	Granulomas along with foreign body type of giant cells
6.	Neurofibroma	Benign	05	18-40	4M 1F	Wavy pattern of spindle cells within a loose stroma with clear areas containing abundant collagen
7.	Endometriosis	Benign	01	35	1F	Biphasic tissue fragment, sheet of palisading epithelial cells and cellular stromal tissue
8.	Spindle cell tumour	Benign Malignant	12 06	20-60	16M 2F	Fascicules or clusters of tightly-packed cells. Cells are small, fusiform, with round of ovoid bland nuclei and small nucleoli. Fragments of pleomorphic cells with features of malignancy.
9.	Fibrous histiocytoma	Benign Malignant	06 02	25-50	5M 1F	Fibroblastic cells with ovoid or elongated nuclei & histiocytic cells with rounded or irregular nuclei with abundant cytoplasm. Fragments of loosely cohesive pleomorphic cells.
10.	Metastatic adenocarcinoma	Malignant	06	50-75	4M 2F	Large pleomorphic malignant cells in clusters, acinar and gland like structure
11.	Metastatic squamous carcinoma	Malignant	03	45-65	3M	Large pleomorphic malignant cells in sheets & lying singly as well
12.	Multiple myeloma	Malignant	04	50-75	3M 1F	Sheets of pleomorphic plasma cells with binucleation and abnormal mitosis

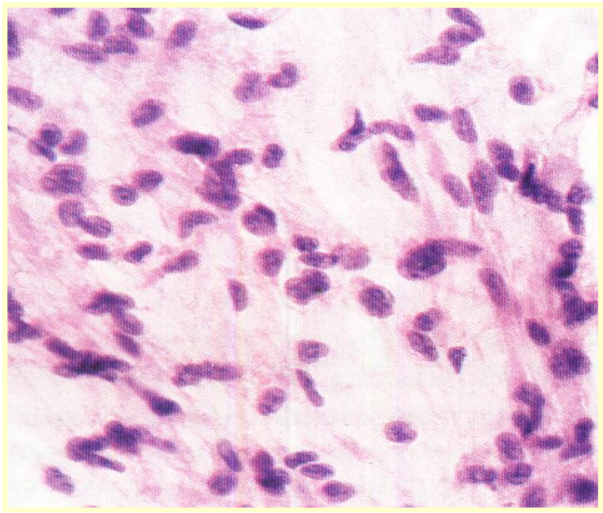
Out of 142 cases, benign neoplasms were 75 (52.8%), infective were 29 (20.4%), malignant were 21 (14.7%) & cystic lesions were 17 (11.9%). Among the neoplasms, lipoma was the commonest followed by tubercular cold abscess in the infective group.

DISCUSSION

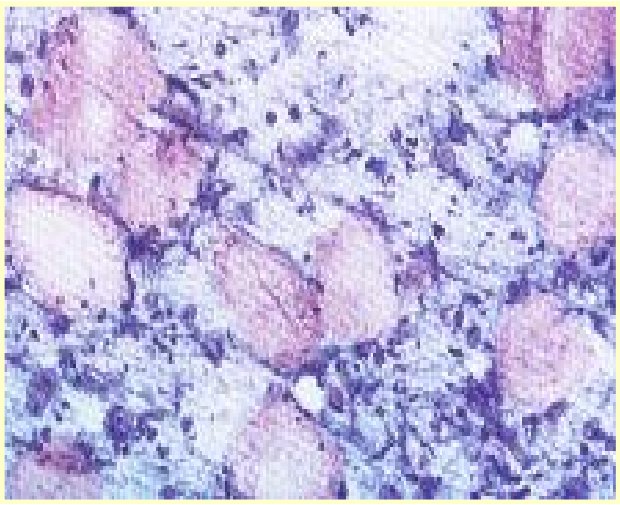
The present study does not have any false positive/false negative results in broadly categorizing the lesion as inflammatory, neoplastic, benign, malignant viz. low and high grade, reactive and cystic with radiological and clinical correlation. Typing particularly of benign cystic lesion has always been difficult on cytology. The vast volume of tissue called soft tissue compartment is represented by fat, fibrous tissue, blood vessels, voluntary muscles and the peripheral nervous system of the entire body. The extremities, thoracic and abdominal walls, mediastinum and retroperitoneum form, part of this diverse organ system (Geisinger *et al*., 2001). A lot of workers discouraged Fine Needle Aspiration Cytology (FNAC) in this field and argued that it should be restricted for assessment of metastatic and recurrent lesions (Orell *et al*., 2005) (Layfield etal., 1998). However, recent studies by Rekhi *et al*. (2007), Liu *et al*. (1999), Layfield *et al*. (1998) & Domanski *et al*. (2007) clearly established the role of cytology in this field with highly sensitive & specific tumour detection in their study-group. In present study, we have taken only superficial lesions. Diseases presenting as tumour like masses in the compartment are challenging, as these tissues can harbour their own mesenchymal tumours and they also provide a hospitable environment for secondary deposits of epithelial, melanocytic and even lymphoid parentage and secondly, non-neoplastic inflammatory masses, cysts or reactive conditions at this site add to the complexity of condition which must enter in the differential diagnosis. Open surgical biopsy procedures, unless meticulously planned with care by skilled personnel, are not without adverse or hazardous effects. The interpretation from a biopsy sample is particularly difficult as there may be variability in appearances in different parts of single tumour



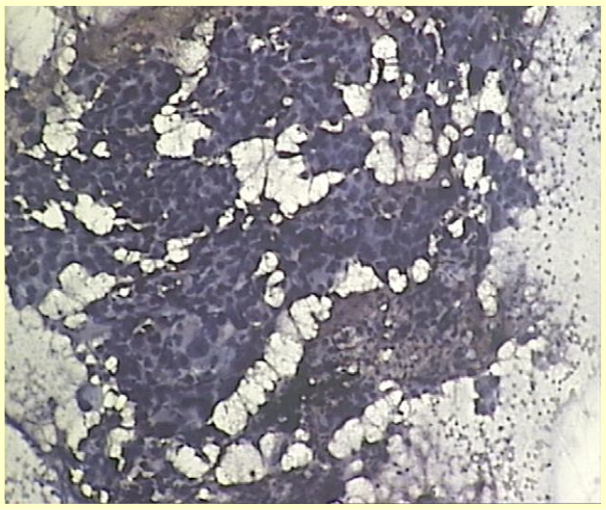
LIPOMA (10X PAP)



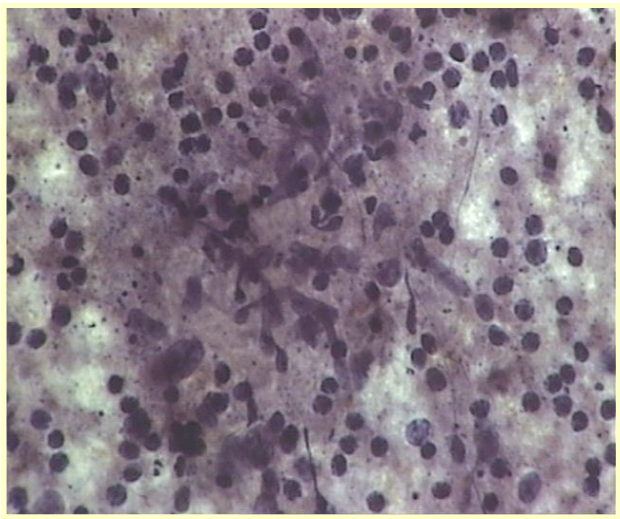
SPINDLE CELL TUMOUR (LOW GRADE) (40X H&E)



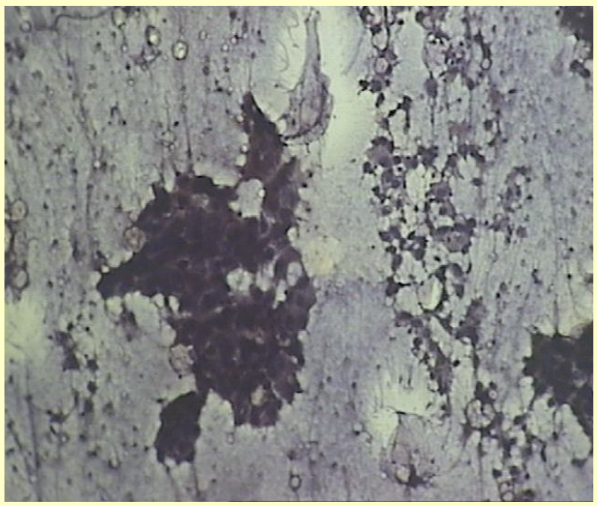
EPIDERMAL INCLUSION CYST (40X PAP)



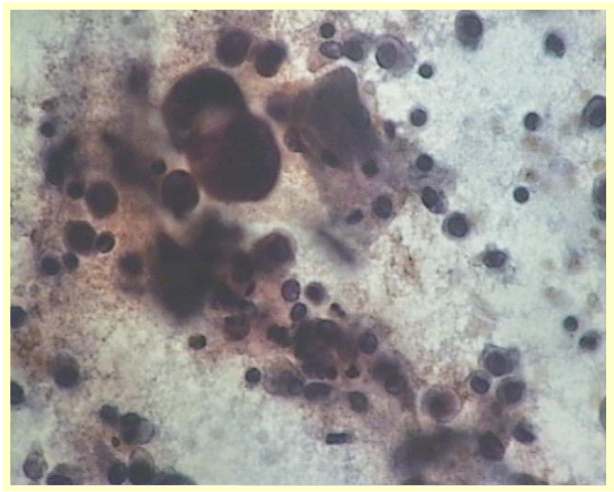
METASTATIC SQUAMOUS CARCINOMA (10X PAP)



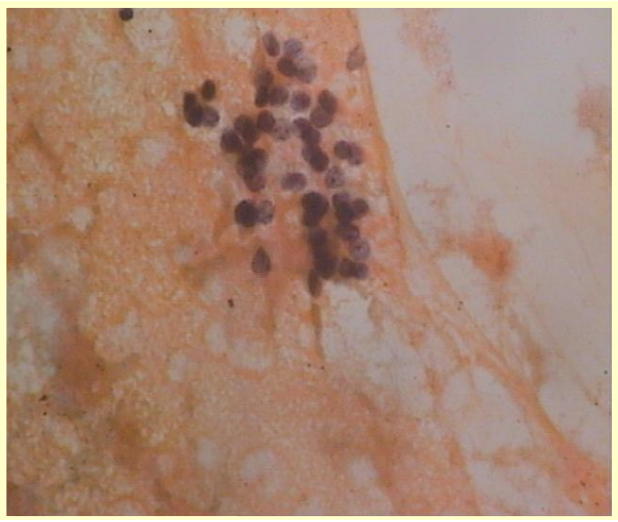
COLD ABSCESS (TB) (40X PAP)



METASTATIC ADENOCARCINOMA (10X PAP)



METASTATIC ADENOCARCINOMA (MUCINOUS) (40X PAP)



METASTATIC ADENOCARCINOMA (FOLLICULAR CARCINOMA THYROID) (40X PAP)

(Geisinger *et al*., 2001) (Orell *et al*., 2005). This has been brought out by Mankin *et al* in their study by highlighting the facts that inappropriate biopsy techniques could produce problems of patients management (20% cases), adverse prognosis (80%) and unnecessary amputations (5%). A retrospective analysis of FNA material by Akerman *et al*, (1994) from the Orthopaedic Oncology Group, Lund University Hospital over the last 20 years, revealed that diagnostic aspirates were obtained from 475 out of 517 soft tissues tumours (92%). These consisted of tumours of the extremities, trunk and included 315 benign tumours and 202 sarcomas. A correct diagnosis with regard to benign versus malignant lesion was made in 447 (94%) of the 475 diagnostic aspirates. The main reasons for obtaining insufficient material were the presence of large cystic or necrotic areas, highly vascular lesions or a collagenous background matrix (Domanski *et al*., 2007). Brosjo *et al*. (1994) also reported similar accuracy figures in a retrospective study of 342 cases from the musculo-skeletal tumour group at the Karolinska Hospital, Stockholm. As with FNA material from other sites, it is critical to have a multidisciplinary approach when evaluating aspirated material from soft tissue. The patient age, location, size, mobility and anatomic location of the mass, the clinical presentation (rapid vs slow growth) along with the radiographic findings were correlated with the cytologic features and high sensitivity and specificity is reported (Akerman *et al*., 1994) (Liu *et al*., 1999). Reactive lesions may occur in the superficial or deep soft tissues although they are generally more frequently found superficially. Benign lesions are generally small circumscribed and cutaneous or superficial masses whereas malignant lesions are more often large, infiltrative and deep-seated (Liu *et al*., 1999) (Layfield et al., 1998). Rapid evaluation and triage for ancillary studies decreases the inadequacy rate (Domanski *et al*., 2007).

Conclusion

Cytodiagnosis of subcutaneous nodule with clinical and radiological correlation is simple, cost effective, outpatient procedure with high sensitivity and specificity. It can be effectively used as an initial diagnostic modality for preoperative evaluation as an alternate to open core biopsy in most cases.

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