FNAC as Reliable Preoperative Diagnotic Test in Nodular Skin Lesions

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ABSTRACT

Introduction: Nodular skin lesions range from inflammatory to the neoplastic condition of various components of the skin. Fine-needle aspiration cytology (FNAC) is commonly used as a diagnostic procedure to evaluate such cases so that patient can be followed in cases of benign diagnosis and subjected to surgery in malignant diagnosis thereby decreasing the rate of unnecessary surgery. However, few studies have addressed the accuracy of FNAC.

Aims and Objective: Study is aimed to evaluate the accuracy of FNAC as compared with histopathology in the diagnosis of nodular skin lesions.

Material and Methods: This retrospective study was done at our department from January 2014 to August 2014. A total of 220 cases presented with nodular skin lesions and were assessed by FNAC and subsequently correlated with the histopathological diagnosis whenever possible. Slides were stained with routine stains and special stains as and when required. The accuracy of FNAC for the diagnosis of non-neoplastic and neoplastic lesions was determined using histopathology as the gold standard.

Results: Of 220 cases, only 77 cases were biopsied in histopathology of which 28 were non-neoplastic, 40 benign neoplasms and 9 malignant cases. Most common lesion observed was lipoma(45.45% cases) followed by epidermal keratinous cyst(21.36%cases).The most common primary malignant lesion observed was basal cell carcinoma 3 cases(23.07%). For diagnosing neoplasia, cytology had a sensitivity of 94%, a specificity of 92.85% and a positive predictive value of 95.91%.

Conclusions: The results of this study confirmed FNAC as a reliable and useful diagnostic procedure for the evaluation of palpable skin lesions .Cytodiagnostic errors of some cases with overlapping cytological features can be avoided by paying attention to the possible pitfalls.

KEYWORDS: Nodular Skin Lesions, FNAC.

INTRODUCTION

Skin is the largest organ of the body acting as a barrier, protecting the body's vulnerable interior. The skin has three main layers: epidermis, dermis and sub cutis which is mainly adipose tissue containing vessels which supply and drain the dermal blood vasculature. The skin adenexa is represented by hair follicle, sebaceous gland, sweat and apocrine glands.[1]

Nodular skin lesions encountered range from inflammatory to the neoplastic condition developing as a result of benign or malignant proliferation of keratinocytes, melanocytes, dermal structure, metabolic deposits, metastatic cutaneous neoplasms and granulomatous lesion of bacterial & viral etiology. Because of diverse origin, they are tempting lesion for fine needle aspiration cytology (FNAC).

FNAC is a relatively non-traumatic procedure for sampling both the superficial and deep-seated masses. Multiple samples can be obtained in the same setting. The technique is relatively painless, produces a speedy result and is cheap.

Although text books describe FNAC of skin lesions[2,3], yet it has not been widely practiced, mainly because surgical excision and biopsy are relatively easy procedures. However, few studies have addressed the accuracy of FNAC.

AIMS AND OBJECTIVES

The present study is aimed to evaluate the accuracy of FNAC as compared with histopathology as the gold standard in the diagnosis of nodular skin lesions.

MATERIAL AND METHOD

The study was done from January 2014 to August 2014 comprising of 220 cases, of all age groups, clinically having nodular skin swellings and were evaluated by FNAC. These patients presented with swelling lying between skin and bones without involvement of bones. From this group- lymph node, thyroid, breast and salivary glands were excluded. A written consent was obtained in all cases. For aspiration, 10 ml dry sterile syringe coupled with 22- 23 gauge needle was used. Neither premedication nor local anesthetic was used. Smears were fixed in 95% ethanol for 20 minute and stained with Haematoxylin and Eosin. Air dried smears were stained with Giemsa stain. The diagnosis was made cytopathologically and subsequently correlated with the histopathological diagnosis whenever possible. Slides were stained with special stains as and when required. The accuracy of FNAC for the diagnosis of non-neoplastic and neoplastic lesions was determined using histopathology as the gold standard.

Apart from these 220 cases, 10 smears showed unsatisfactory aspirates and hence were excluded from the study. While interpreting the findings, clinical and other diagnostic data were also taken into consideration.

Table 1: Non-Neoplastic nodular skin lesions with histological correlation

Type of lesion on FNAC	No. of cases	Histological Diagnosis		Biopsy Not Available
		Consistent	Inconsistent	
Inflammatory Lesion	24	8		16
Epidermal Keratinous Cyst	47	14	1(Keratoacanthoma) 1(Sebaceous Adenoma)	31
Ganglion	5	2		3
Calcinosis Cutis	2	2		0
TOTAL	78	26	2	50

Table 2: Benign nodular skin lesions with histological correlation

Type of lesion on FNAC	No. of cases	Histological Diagnosis		Biopsy Not Available
		Consistent	Inconsistent	
Lipoma	100	28		72
Fibrolipoma	2	1		1
Haemangioma	3	2		1
Nevus	2	1	1(Eccrine Acrospiroma)	0
Hematoma	1			1
Cylindroma	1	1		0
Neurofibroma	2			2
Fibroma	1			1
Benign Spindle Cell Lesion	16	5	1(Pilomatricoma)	10
Neurilemlma	1			1
TOTAL	129	38	2	89

Table 3: Malignant nodular skin lesions with histological correlation

Type of lesion on FNAC	No. of cases	Histological Diagnosis		Biopsy Not Available
		Consistent	Inconsistent	
Squamous Cell Carcinoma	1	1		0
Basal Cell Carcinoma	3	3		0
Anaplastic Carcinoma	1	1		0
Metastatic Deposist of known primary	3	3		0
Myxoid Fibroblastic Neoplasm	2	1		1
Malignant Mesenchymal Lesion	3			3
TOTAL	13	9	-	15

RESULTS

The study included cases with an age range from 4 to 83 years .The majority of the patients belonged to the age group of 21-30 years with male to female ratio of 7:5. Out of 220 cases, 78 were non-neoplastic and 142 neoplastic lesions which includes 129 benign, 11 malignant and 2 suspicious for malignancy.

The most common benign neoplasm encountered was lipoma (77.52%) whereas basal cell carcinoma (23.07%) was the most common primary malignant lesion. The most common site was thigh 17.72% followed by arm 14.54% and back 10.90%.

Of the 78 non neoplastic cases, epidermal keratinous cyst was the most common 47 cases (60.25%), inflammatory lesions 24 cases (30.76%), ganglion cyst 5 cases (6.41%) and calcinosis cutis being the rare 2 cases (2.56%).

129 benign neoplasms included 100 cases(75.52%) of lipoma, 16(12.40%) spindle cell lesion, 3(2.39%) haemangioma, 2(1.55%) cases each of fibrolipoma, nevus and neurofibroma, 1 case (0.77%) each of hematoma ,cylindroma, fibroma and neurilemoma.

11 malignant cases comprised of 3 (23.07%) basal cell carcinoma, 1 case (7.69%) each of squamous cell carcinoma & anaplastic carcinoma each, 3(23.07%) malignant mesenchymal lesion and 3(23.07%) metastatic deposits, 2 from squamous cell carcinoma &1from adenocarcinoma, 2 were suspicious for myxoid fibroblastic neoplasm.

Cytohistopathological correlation was available in 77 cases.

Table 1 shows cytological spectrum of the non-neoplastic cases with their histopathological correlation. Of the 78 non neoplastic cases biopsy was available in 28 cases. 26 were cytologically consistent and 2 cases were false negative. False negativity was in diagnosing keratoacanthoma and sebaceous adenoma which were cytologically diagnosed as epidermal keratinous cyst and infected epidermal cyst. Thus, a false negativity of 7.14% was assessed.

Of 130 benign cases ,biopsy was done in 40 cases, cytological diagnosis was consistent with 38 cases. Two cases were false positive. One out of two benign nevus turned out eccrine acrospiroma on histopathology and one case of spindle cell lesion was pilomatricoma on biopsy with false positivity of 4.25%. Diagnostic accuracy was 100% in lipoma, fibrolipoma, and cylindroma, 83.33% in spindle cell lesions and 50% in benign nevus (Table 2

8 cases were biopsied out of 11 malignant cases on FNAC and confirmed the same on histopathology. One case of myxoid fibroblastic lesion suspicious for malignancy was confirmed on histopathology (Table-3). Diagnostic accuracy was 100% and no false positivity was reported. Sensitivity of 94%, specificity of 92.85% and positive predictive value of 95.91% was assessed.

DISCUSSION

FNAC is routinely used as a screening test, either as a sole method or along with radiology, fluoroscopy, C.T. scan etc. It is a useful and convenient technique for the diagnosis and follow up of nodular skin lesions. However FNAC of soft tissue lesions has not been widely used because of concern about its diagnostic accuracy. But it gives fairly accurate results regarding the nature of lesion, especially when supported by appropriate clinical findings and other relevant data[4].

In general, the ratio of benign to malignant tumors is about 100:1 in a hospital population, and their annual incidence is approximately 300 per 100,000 populations[5]. Our study has shown benign to malignant ratio of 10:1. The higher incidence of the malignant tumors in our case could probably be due to the greater size and a rapid increase in the size of the mass that led to seek early medical attention.

The present study included patients of all age group with a mean age 43.5 years. Patients who had benign and non-neoplastic lesions were relatively younger than malignant cases. More than 70% of the malignant cases were in seventh decade. Lipoma was the most common lesion diagnosed which coincided with the study done by Enzinger et al (1995) and Layfield LJ et al [6]. Nodular fasciitis most commonly occurs in adults on the volar aspect of the forearm but in our study it was present on the back.[7] Fibroma was the second common benign soft tissue tumour in this study and 100% correlation was observed between FNA and histopathology, thus acquiring 100% diagnostic accuracy. All the cases were found in lower extremities.

The present study revealed Basal cell carcinoma as the most common malignant tumor of the skin with 100% diagnostic accuracy which is comparable to various other studies. Various studies in the past states that the metastatic deposits usually occur close to the region of the primary growth[8,9]. As in our study two cases of metastasis of lung presented on chest wall and one case of renal cell carcinoma as paraumblical nodule.

An accurate diagnosis of benign and malignant skin lesions is sometimes difficult because of overlapping cytological features. Out of 4 histologically proven skin adenexal lesion only one case of eccrine cylindroma was cytologically diagnosed.

Only a few published series discuss FNAC of soft tissue tumors. Study done by LJ Leyfield et al[6] on FNAC of soft tissue tumors with comparative histopathology showed the diagnostic sensitivity of FNAC for detecting malignant neoplasm was 95% and specificity of 95%. There were approximately 2% of false positive and false negative rate. Similar study of FNAC of soft tissue tumors in correlation with histopathology was done by Kulkarni DR et al.[10]. Our study also showed sensitivity of 94%, specificity of 92.85%, and positive predictive value of 95.91%.
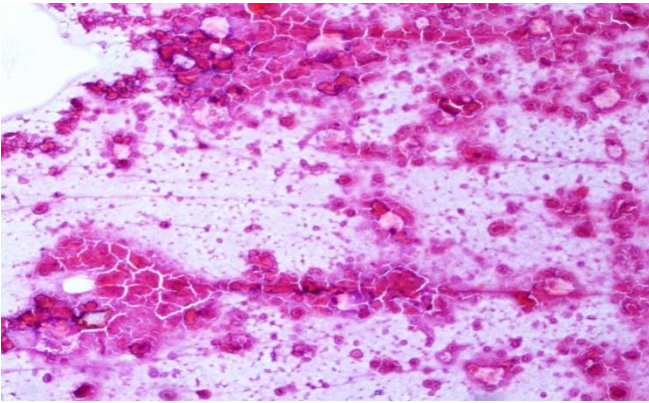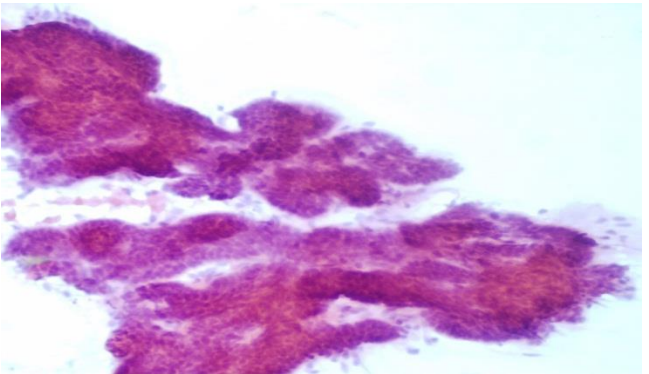
Figure-1a: FNAC-Calcinosis Cutis showing amorphous granular material without any epithelial cells (x100, H&E)
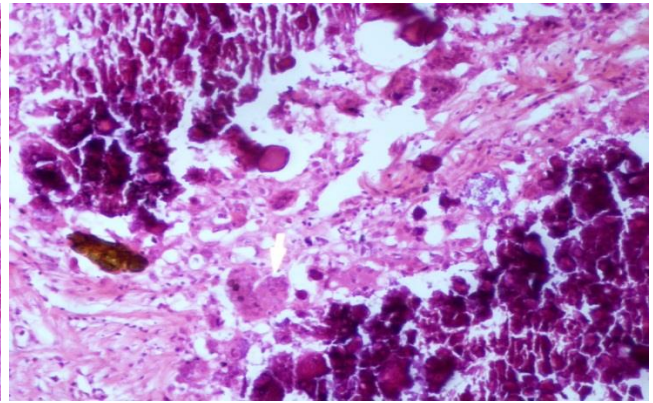

Figure-1b: Tissue section microphotograph of calcinosis cutis showing calcified deposists surrounded by variable number of histiocytes and lymphocytes (H&E, x200)


Figure-2a: FNAC-Basal Cell Carcinoma showing cohesive epithelial fragments with alternating sharp and irregular borders and peripheral pallisading of nuclei(x200, Giemsa)
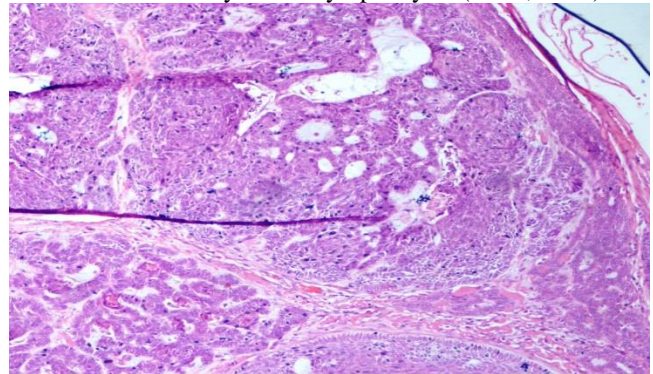

**Figure-2b**: Corresponding tissue section(x100, H&E)- Basal cell carcinoma
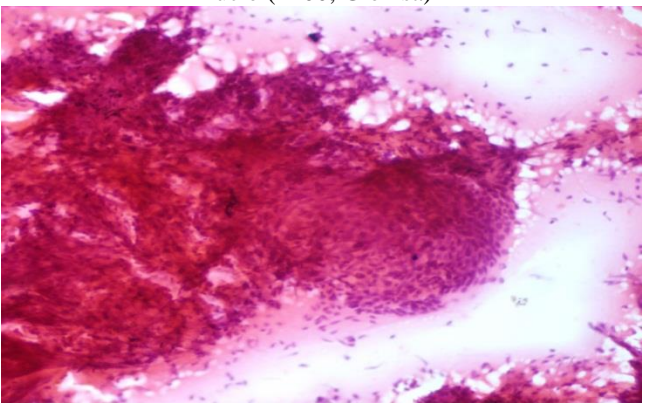
Figure-3a: FNAC-Cutaneous Cylindroma showing cell-rich pseudopapillary fragments of cohesive basalod epithelial cells and hyaline stromal globules
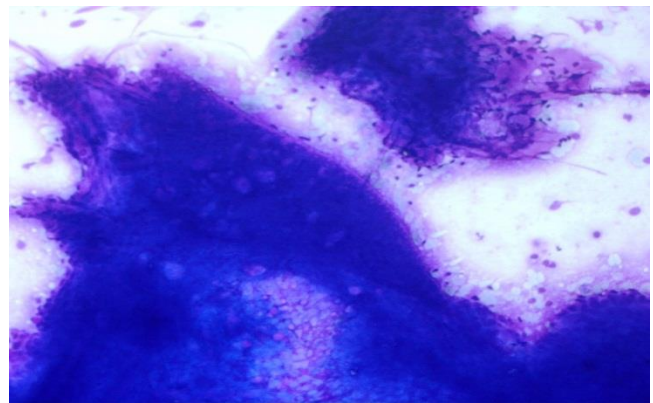
Figure-3a: FNAC-Cutaneous Cylindroma showing cell-rich pseudopapillary fragments of cohesive basalod epithelial cells and hyaline stromal globules
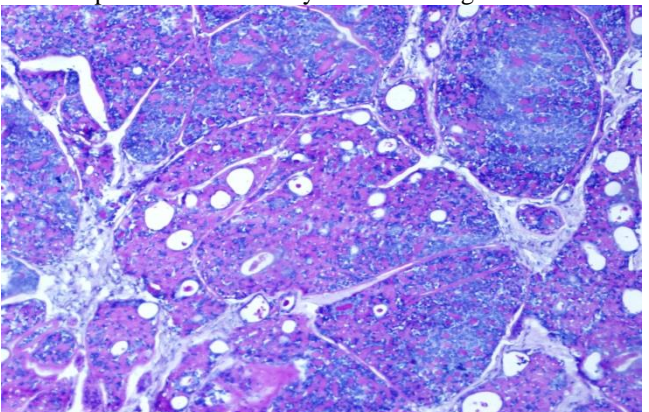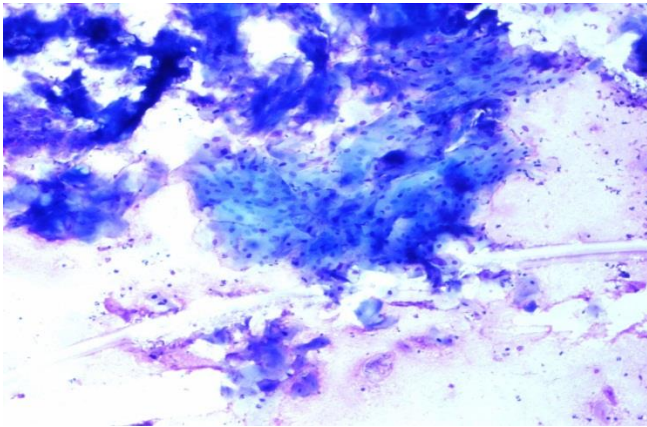

Figure-3b: Cutaneous Cylindroma showing irregular islands containing numerous tubular lumina and hyalinised sheath around the lobules. (PAS stain, x200)
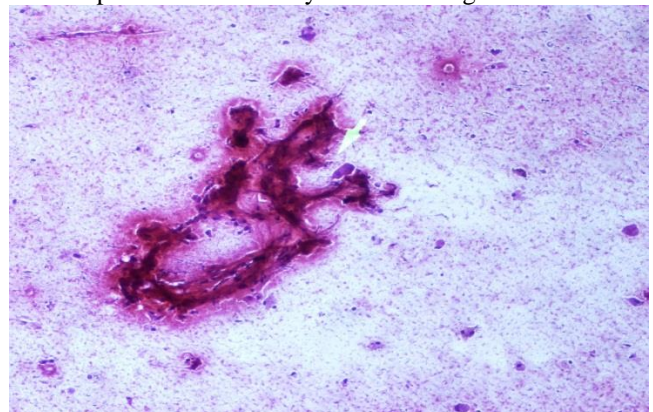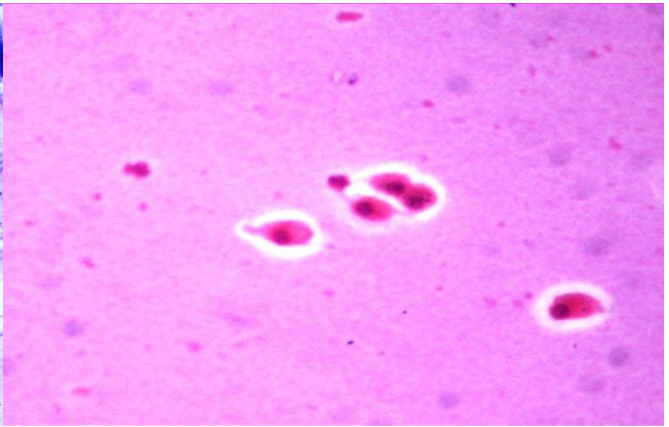

Figure-4a: FNAC-Metastaic Squamous Cell Carcinoma showing keratinizing squamous cell, densely hyperchromatic nuclei.

Figure-4b: H&E, with pure blue cytoplasm in Giemsa x100, Section 4a

Figure-5: FNAC from ganglion.

CONCLUSION

FNAC is a simple, fast and inexpensive technique with high sensitivity and specificity and has proved to be very useful in quick confirmation of the nature of the nodular skin lesion. With adherence to evidence-based approaches cytology will remain a purposeful, minimally invasive and quick method that can provide accurate information to clinicians.

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CONFLICT OF INTEREST-None declared.

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