

Clinicopathological correlation of non-neoplastic nodular skin lesions: Experience from a tertiary care institute

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Abstract

Aim: To evaluate the efficacy and diagnostic accuracy of fine-needle aspiration cytology (FNAC) in nonneoplastic nodular skin lesions.

Materials and Methods: Nonneoplastic nodular skin lesions were assessed by FNAC and slide stained by Giemsa staining followed by biopsy in all cases. Histopathological slides were stained by haematoxylin and eosin stain and the special stain was used wherever required. Efficacy and accuracy were determined using histopathology as a gold standard.

Results: Thirty-five cases with nodular skin lesions were subjected to cytological examination followed by biopsy. The most common infectious nodule was granulomatous dermatitis (20%) followed by cutaneous leishmaniasis (17.14%). The most commonly encountered noninfectious nonneoplastic nodular lesion was epithelial cyst (83.33%) followed by ganglion (16.67%). FNAC had a sensitivity of 80%, the specificity of 100% and diagnostic accuracy of 93.8% in diagnosing nonneoplastic skin nodules.

Conclusion: Cytology FNAC is safe, cost-effective and patient complaint procedure for the evaluation of nonneoplastic nodular skin lesions and can be performed in the outpatient clinic.

Keywords: Fine-needle aspiration cytology, nodular skin lesions, nonneoplastic

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INTRODUCTION

Nonneoplastic nodular skin lesions can result from inflammatory and infectious etiology such as bacterial, viral, or fungal infections. The most commonly used method for diagnosis was skin biopsy but nowadays fine needle aspiration cytology (FNAC) is extensively used in the diagnosis of nodular skin lesions as this technique is simple, easy to perform, less painful, risk-free, and gives the rapid diagnosis. Cytology helps to categorize surgical from nonsurgical cases. The utility of FNAC has been expanded to diagnose different skin conditions to avoid wide excision biopsy in diagnostic dilemmas.^[1]

Cytology and skin biopsy form the basis of differential diagnosis in clinically similar nodular lesions thereby yielding important information to the pathologist and dermatologist.^[2]

The clinical value of FNAC has been recognized beyond the tumor diagnosis. It is also valuable in the diagnosis of inflammatory, infectious and degenerative conditions, in which samples can be used for microbiological and biochemical analysis in addition to cytological preparation.^[3] The aim is to study cytomorphological features and evaluate

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the efficacy and diagnostic accuracy of FNAC in nonneoplastic nodular skin lesions.

MATERIALS AND METHODS

The study was conducted on 35 patients who clinically presented with nodular skin lesions and diagnosed as a nonneoplastic lesion. FNAC was performed in these 35 patients after written informed consent. Clinical examination, FNAC followed by biopsy done in all cases.

Cytological material was aspirated by using 23G needle and 20 ml plastic syringe with a detachable syringe holder (Franzen Handle). Giemsa staining was done for FNAC and hematoxylin and eosin staining for biopsy. Special stain was used wherever required.

Final evaluation and diagnostic accuracy were determined using histopathology as a gold standard.

RESULTS

A total number of 35 patients presented with nodular skin lesions were included in this study and were subjected to FNAC followed by biopsy. The age range of patients was 4 years to 75 years with the maximum number of cases were in the age group of 31–40 years. Female patients were more in number as compared to males with the sex ratio of 1:1.5. The most common involved site was head and neck (39.47%). The spectrum of nonneoplastic nodular skin lesions is shown in Tables 1-3.

Table 4 from the above table, the high cytologic and histopathological correlation was observed for nonneoplastic nodular skin lesions. Five cases were diagnosed with granulomatous dermatitis on cytology and further categorization is done on histopathology as one case of cutaneous leishmaniasis, one case of lepromatous leprosy, one case of borderline tuberculoid (BT) leprosy, and two cases of sporotrichosis.

There was 100% cytohistological correlation in five cases of cutaneous leishmaniasis, [Figures 1 and 2] two cases of lepromatous leprosy, [Figures 3-4] one case of BT leprosy, one case of infected epidermal cyst, two cases of the ganglion and ten cases of an epidermal cyst.

Using the above data, sensitivity, specificity, and diagnostic accuracy were calculated as 80%, 100%, and 93.8%, respectively, for nonneoplastic nodular skin lesions.

Table 1: Percentage of infectious and noninfectious nodular skin lesions

Nonneoplastic	Number of cases (%)
Infectious	23 (65.72)
Noninfectious	12 (34.28)
Total	35 (100)

Table 2: Spectrum of infectious nodular lesions on cytology (n=23)

Category	Number of cases (%)
Granulomatous dermatitis	12 (52.18)
Cutaneous leishmaniasis	5 (21.74)
Lepromatous leprosy	3 (13.04)
Inflammatory pathology	2 (8.69)
Infectious epithelial cyst	1 (4.35)
Total	23 (100)

Table 3: Spectrum of non-infectious nodular lesions on cytology (n=12)

Category	Number of cases (%)
Epithelial cyst	10 (83.33)
Ganglion	2 (16.67)
Total	12 (100)

DISCUSSION

FNAC is routinely used as a screening test and convenient technique for the diagnosis and follow up of nodular skin lesions. The present study included 35 patients with the maximum in the age group of 31–40 years similar seen in Singh *et al.*^[4] Female predominance was seen with male-to-female ratio of 1:1.5 as seen by Patel *et al.*^[5] The commonly involved site was head and neck (39.47%) similar to Chauhan *et al.*^[6]

The study included 65.72% of infectious and 34.28% of noninfectious lesions comparable to the study by Chauhan *et al.*^[6] The most common infectious nonneoplastic nodular lesion was granulomatous dermatitis followed by cutaneous leishmaniasis and leprosy, whereas a study by Chauhan *et al.*,^[6] the most common was leprosy followed by granulomatous dermatitis and observed a wide spectrum of infectious lesions similar to our study.

Twelve cases of granulomatous inflammation were diagnosed on cytology out of which seven cases were diagnosed as granulomatous dermatitis, two cases of sporotrichosis, each of cutaneous leishmaniasis, lepromatous leprosy, BT leprosy on histopathology. In 7 cases of granulomatous dermatitis, PAS modified Ziehl–Neelsen, Giemsa and acid-fast bacilli were negative.

The sensitivity of cytology in the detection of Leishman-Donovan bodies (LD) bodies was 83.33% in our study, considering histopathology as a gold standard. This was much higher than the study by Bahamdan *et al.*,^[7] Chauhan *et al.*^[6]

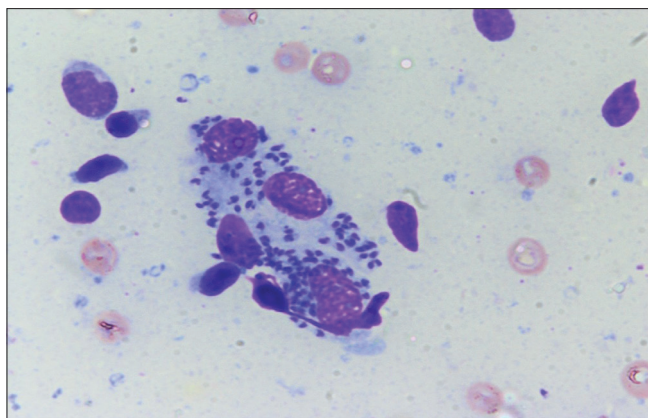


Figure 1: Fine needle aspiration smear of cutaneous leishmaniasis showing LD bodies inside macrophages (Giemsa, x100)

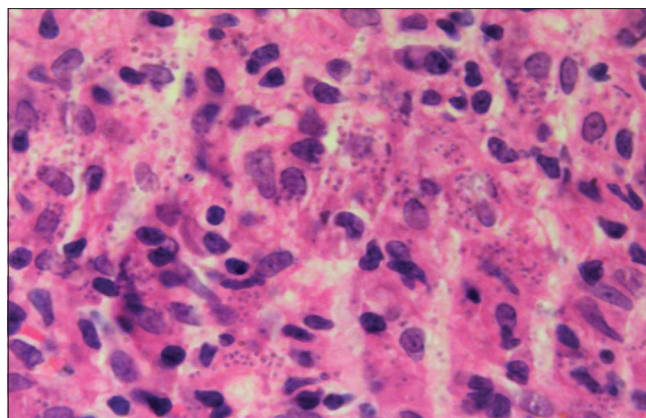


Figure 2: Histopathology revealing numerous LD bodies in dermal macrophages in cutaneous leishmaniasis (H and E, x100)

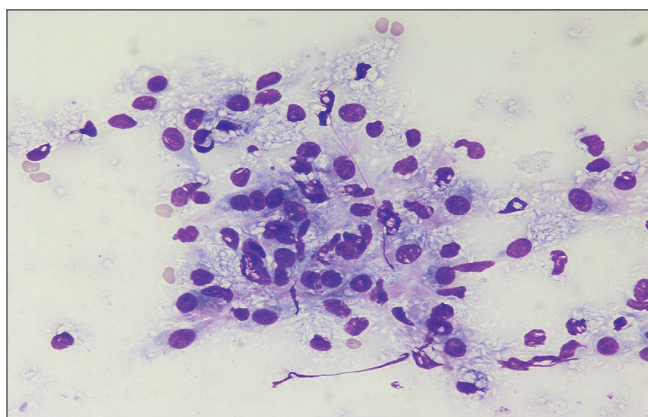


Figure 3: Fine needle aspiration smear of lepromatous leprosy showing clusters of foamy macrophages (Giemsa, x100)

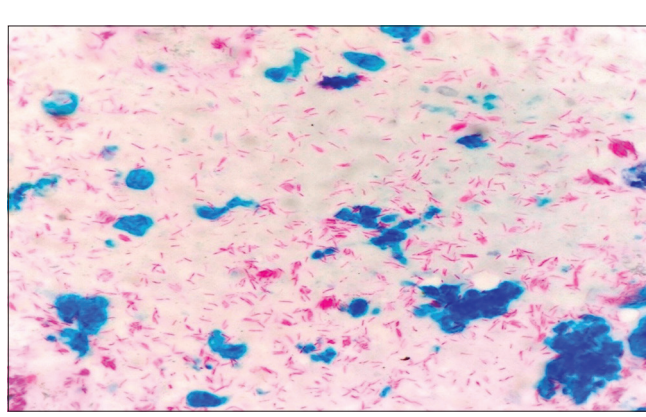


Figure 4: Modified Ziehl–Neelsen stain revealing abundant lepra bacilli in the fine needle aspiration smears of lepromatous leprosy (Modified Ziehl–Neelsen stain)

who observed 72.4% and 66.67% sensitivity of the detection of LD bodies. Two cases were diagnosed with lepromatous leprosy by the presence of numerous foamy macrophages and few lymphocytes. Similar observations were noticed by the study of Prasad *et al.*^[8] and Chauhan *et al.*^[6]

One case was diagnosed with BT leprosy. Two cases diagnosed as granulomatous inflammation on cytology were diagnosed as lepromatous leprosy and BT leprosy. However, no case of borderline lepromatous, midborderline (BB), and tuberculoid leprosy was seen in our study. Various other studies such as Prasad *et al.*,^[8] Singh *et al.*^[4] and Chauhan *et al.*^[6] also subclassified Hansen's disease on cytology.

The Ridley-Jopling classification used for classifying leprosy and based on clinical, bacteriological, immunological, and histopathological parameters. We also used these criteria to subclassified leprosy on cytology. Diagnostic accuracy of leprosy was 60% in our study and a similar correlation was seen in a study by Jaswal *et al.*^[9] having diagnostic accuracy of 64%.

The epidermal cyst was the most common noninfectious nonneoplastic lesion followed by ganglion encountered.

Similar observations were seen in studies by Jain *et al.*,^[10] Bhowmik *et al.*,^[11] Gupta *et al.*^[12]

The diagnostic accuracy of fine needle aspiration of epidermal cyst in the present study was 100% compared with study by Patel *et al.*^[5] with a diagnostic accuracy of 100%. FNAC features correlated well with the studies by Eimani and Kumar,^[13] Shet *et al.*^[14] and Patel *et al.*^[5]

Cytohstological correlation was seen in 28 cases out of 35 nonneoplastic nodular skin lesions. The sensitivity and diagnostic accuracy of nonneoplastic nodular lesions in our study were 100% and 93.8% respectively which were similar to studies by Jain *et al.*^[10] and Chauhan *et al.*^[6] However, sensitivity in our study was 80% comparable to studies by Singh *et al.*^[4] and Chauhan *et al.*^[6]

CONCLUSION

There is a good correlation between cytological and histological features of skin nodules for nonneoplastic lesions. FNAC of nodular skin lesions has some limitations

Table 4: Cyto-histopathological correlation of nonneoplastic nodular skin lesions

Cytological diagnosis	Number of cases	Histopathological Dx.	Number of cases		
Granulomatous inflammation	12	Granulomatous dermatitis	7		
		Cutaneous leishmaniasis	1		
		Lepromatous leprosy	1		
		BT leprosy	1		
		Sporotrichosis	2		
		Cutaneous leishmaniasis	5	Cutaneous leishmaniasis	5
				Lepromatous leprosy	2
Borderline tuberculoid leprosy	1	Borderline tuberculoid leprosy	1		
Inflammatory lesion	2	Erythema nodosum	2		
Epithelial cyst	10	Epidermal cyst	10		
Infected epithelial cyst	1	Infected epidermal cyst	1		
Ganglion	2	Ganglion	2		
Total	35	Total	35		

BT: Borderedline Tuberculoid

in few cases due to inadequate yield, poor preservation, and difficulty in exact characterization. In these cases, diagnosis is dependent on histopathological examination. Cytological findings must be correlated with the clinical history and histopathological findings wherever necessary for the diagnosis and treatment of nodular skin lesions.

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Conflicts of interest

There are no conflicts of interest.

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