

Clinico-Cytohistopathological Correlation of Nodular Skin Lesions In Kumaun Region

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Citation this Article: Savita Chaudhary, Prabhat Pant, Saurabh Agrawal, Pankaj Kumar Verma, Vindhya Joshi, “Clinico-Cytohistopathological Correlation of Nodular Skin Lesions In Kumaun Region”, IJMSIR- April - 2020, Vol – 5, Issue -2, P. No. 136 – 144.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Both cytology and skin biopsy form the basis of differential diagnosis in clinically similar dermatosis, thereby yielding important information to the pathologist and dermatologist. The findings of cytology can be correlated with histopathology in suitable cases.

Objective: This present study was designed and conducted with an aim to study the clinico-cytohistopathological correlation of nodular skin lesions in Kumaun Region.

Methods: A total of 161 cases of nodular skin lesions including inflammatory, benign and malignant conditions in all age group. were studied over a period of 2 years . After proper history and through clinical examination, superficial lesions were subjected to direct aspiration whereas deep seated lesions were aspirated under USG guidance using aseptic precautions. Air-dried smears were stained with May–Grunwald–Giemsa stain. Alcohol fixed smears were

stained using routine Papanicolaou (Pap) and H &E method. For histopathological evaluation tissue sections were obtained from tissue blocks prepared after processing of the specimens received within the department.

Results: Mean age of the study population in this study came out to be 34.67±16.33years with a Male: Female ratio of 1.98:1. Lipoma was the most common lesion found in our study. Diagnostic accuracy of FNAC for non- neoplastic nodular skin lesions came to be 71.8 %., for benign nodular skin lesions came to be 81.3%., for malignant nodular skin lesions came to be 50%. Overall diagnostic accuracy of FNAC in diagnosing nodular skin lesions in the present study came to be 77.7%.

Conclusion: FNAC provide definite diagnosis in majority of cases especially benign nodular skin lesions including lipoma, ganglion cysts and giant cell tumors of tendon sheath and even majority of cases of non-neoplastic nodular skin lesions. But its accuracy for

malignant nodular skin lesions was questionable. For diagnosis in these cases we had to depend completely upon histopathological examination.

Keywords: Fine needle aspiration, clinicopathological correlation, nodular skin lesions, non neoplastic, neoplastic skin lesions.

Introduction

The skin has three main layers: epidermis, dermis and subcutis which is mainly adipose tissue containing vessels which supply and drain the dermal blood vasculature.^{1,2} The spectrum of skin lesions are vast & ranges from benign conditions like sebaceous cyst (epidermal cyst), lipoma, abscess, warts, keloid scars, parasitic conditions & pyogenic granuloma etc. to malignant conditions³

A skin nodule can therefore be defined as benign or malignant round or oval and elevated solid lesion that arises from the skin or subcutaneous tissue. There are 3 general categories of diseases associated with nodule formation: inflammatory or reactive, infectious, and neoplastic. These categories can be further subdivided in conjunction with clinical characteristics of the lesions, hematomas, sialoceles, cysts, abscesses, granulomas -all can produce masses in the skin a subcutaneous tissues.

Cutaneous nodules can develop as a results of benign or malignant proliferation of keratinocytes, melanocytes, dermal structures, metabolic deposits, metastatic neoplasm inflammatory lesions of skin in bacterial viral, fungal or parasitic.⁴

Inflammatory diseases can be of either epidermal appendages mainly rosacea, alopecia arcata, acne vulgaris, keratosis pilaris. Inflammatory disease of subcutaneous fat: erythema nodosum, erythema induratum, lipedema, scleremanonatorum.⁵

Skin tumors especially malignant tumors are one of the health problems in community which is quiet important, although mortality is low. Because of diverse origin, they are tempting lesion for fine needle aspiration cytology (FNAC).

Recently, attempts are being made to diagnose dermatological lesions especially nodular lesions utilizing fine needle aspiration cytology. During the initial stage, it can be assessed whether the case is an inflammatory process or a neoplasm. If the diagnosis of a tumour growth is confirmed, a cytological test of the lymph nodes could provide information on the stage, prognosis, and the presence of metastasis. In cases of postoperative recurrence, the consequent cytological test could quickly and precisely indicate the need for further interventions. A definitive specific diagnosis may not be possible by cytology in a proportion of cases, but a categorisation of disease and a differential diagnosis with an estimate of probability can usually be provided to suggest the most efficient further investigations, saving time and resources.⁶

Both cytology and skin biopsy form the basis of differential diagnosis in clinically similar dermatosis, thereby yielding important information to the pathologist and dermatologist. The findings of cytology can be correlated with histopathology in suitable cases.

Though cytopathology is an excellent diagnostic tool in routine dermatologic practice, studies relating to clinical, histopathological and cytological correlation of the nodular skin lesions are few. Therefore, with a first of its kind in kamuan region, this present study was designed and conducted with an aim to study the clinico-cytohistopathological correlation of nodular skin lesions in Kumaun Region.

Material and Methods

The present cross sectional, observational study was conducted in Department of Pathology, Dr. Susheela Tiwari Government Hospital & Government Medical College, Haldwani, Nainital . A total of 161 cases of nodular skin lesions including inflammatory, benign and malignant conditions in all age group. were studied over a period of 2 years . Those nodular lesions which were not diagnosed as skin origin and unwilling patients were excluded from our study. Ethical clearance was taken from institutional ethical committee.

Method of data collection: After proper history and through clinical examination, the procedure was explained to the patient. Superficial lesions were subjected to direct aspiration whereas deep seated lesions were aspirated under USG guidance using aseptic precautions. A 22-23 G needle for superficial lesions or Lumbar puncture needle of same gauge for deep seated lesions fitted with 10ml syringe was introduced into lesions and aspiration done under negative pressure. Air-dried smears were stained with May–Grunwald–Giemsa stain. Alcohol fixed smears were stained using routine Papanicolaou (Pap) and H &E method. For histopathological evaluation tissue sections were obtained from tissue blocks prepared after processing of the specimens received within the department.

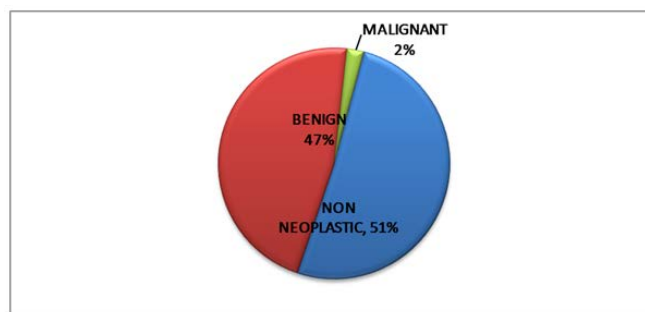
Results

A total of 151 were included in the study. Mean age of the study population in this study came out to be 34.67 ± 16.33 years with a minimum age of 3 years and a maximum of 82 years. Maximum numbers of cases were found to be in 31-40 years comprising of 22.9% of the study population. Males outnumbered females with a Male: Female ratio of 1.98:1.

In the present study, nodular lesions were found to be maximum in head and region accounting for 36.6% of all the sites involved, followed by upper extremities (22.9%), trunk and back region (20.4%), lower extremities (17.3%) and lastly abdomen (2.4%). 18.1 % patients presented with pain/ tenderness as a clinical sign while 81.9% cases did not complain of any kind of pain. On palpation, 87.6% of the lesions were firm in consistency while only 12.4% lesions were soft.

Based on cytological diagnosis of FNAC smears of the nodular lesions, study population was broadly categorised as non-neoplastic, benign and malignant lesions. Non-neoplastic group of nodular skin lesions comprised of majority of the cases accounting for 82/161 cases (50.9%), followed by benign nodular lesions 75/161 cases (46.5%) and least were malignant lesions 4/161 cases (2.4%).

Figure 1: Graphical Representation of Nodular Lesions Based On Cytological Diagnosis on FNAC

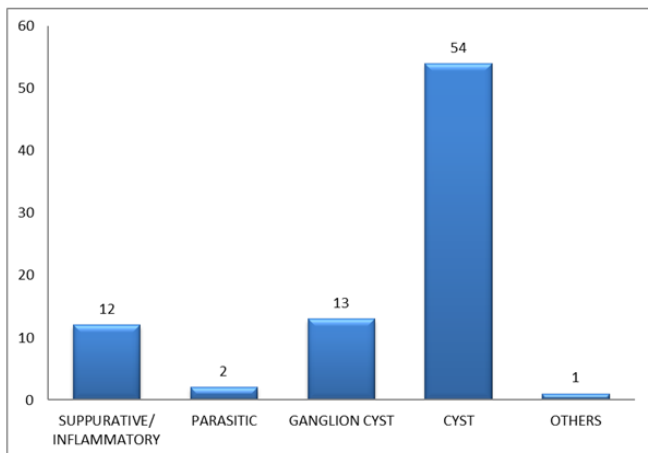


Non Neoplastic Lesions

In the present study 82 cases of non neoplastic nodular lesions were further categorised on basis of cytological diagnosis as: Suppurative/ inflammatory lesions, parasitic lesions, ganglion cyst, other cysts (epidermal inclusion cyst and dermoid cysts) and other lesion (non diagnostic). Cystic lesions (especially epidermal inclusion cyst) were found to be in maximum frequency accounting for 65.8% of the non-neoplastic lesions followed by ganglion cyst (15.8%), and inflammatory/

suppurative lesions (14.6%). Parasitic lesions were found to be least in number (2.4%) within non-neoplastic category of nodular lesions in the present study. 1 case was found to be non diagnostic on FNAC and that is included in the category of others.

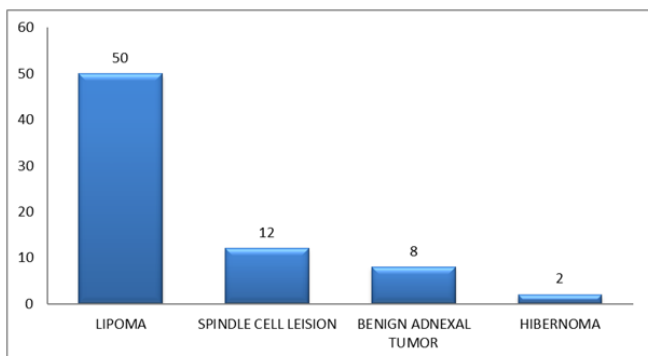
Figure 2: Graphical Representation Showing Lesion Wise Distribution of Non Neoplastic Nodular Lesions on FNAC. (N=82).



Benign Nodular Lesions

Out of total 75 cases of benign nodular lesions lipoma was found to be in maximum frequency (66.6%), followed by spindle cell lesions (16%) and benign adnexal tumor (10.6%). Least number of cases of hibernoma (2.6%) were seen.

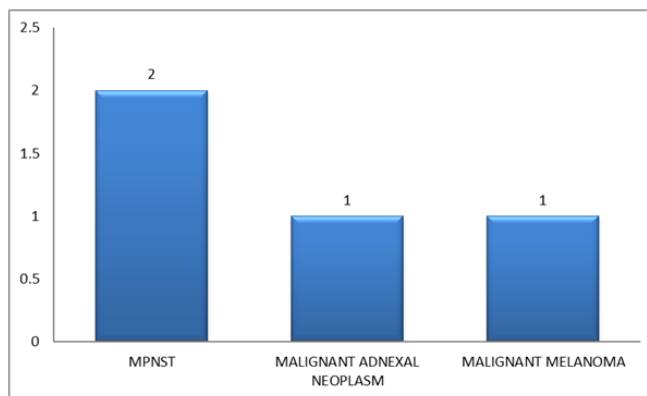
Figure 3: Graphical Representation Showing Lesion Wise Distribution of Benign Nodular Lesions on FNAC. (N=75)



Malignant Nodular Lesions

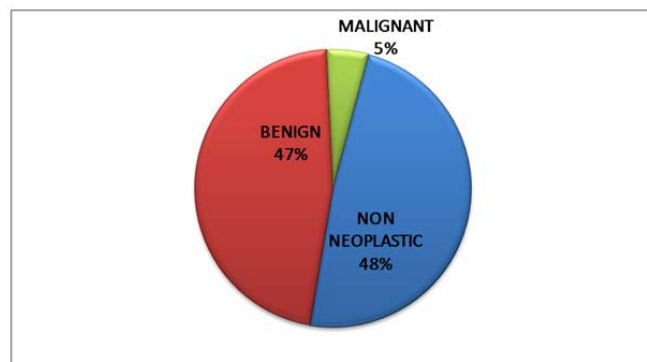
4 cases of malignant nodular lesions were observed in the present study on FNAC which were malignant peripheral nerve sheath tumor (MPNST) (2/4 cases), malignant adnexal neoplasm (1/4 cases) and malignant melanoma (1/4 cases).

Figure 4: Graphical Representation Showing Lesion Wise Distribution of Malignant Nodular Lesions on FNAC. (N=4).



Further, in the present study, based on histological diagnosis of the nodular lesions, non-neoplastic group comprised of majority of the cases accounting for 78/161 cases (48.4%), followed by benign nodular lesions 75/161 cases (46.5%) and least were malignant lesions 8/161 cases (4.9%).

Figure 5: Graphical Representation of Distribution of Nodular Lesions According to Histopathological Diagnosis



Cytohistopathological Correlation

Cytohistopathological correlation was obtained in all 161 cases studied in our study. Of the total 78 non neoplastic cases 56 cases were cytologically consistent with histopathology while 22 cases were inconsistent (final diagnosis on histopathology was different from cytological diagnosis). Further, all cases of gouty tophus, ganglion cyst and epidermal inclusion cyst were correctly diagnosed on FNAC. While pyogenic granuloma, actinomycosis and 1 case of lepromatous leprosy were wrongly diagnosed as suppurative pathology on FNAC. Rest 1 case of lepromatous leprosy, lupus vulgaris and infected sebaceous cyst were wrongly diagnosed as inflammatory pathology.

Out of 3 cases of parasitic cyst 1 case was wrongly diagnosed as inflammatory cyst, out of 9 cases of dermoid cyst 8 were wrongly diagnosed as epidermal inclusion cyst and lastly all 5 cases of Trichilemmal cyst were wrongly diagnosed as epidermal inclusion cyst. On histopathology out of these 78 cases 56/78 were correctly diagnosed on FNAC while 22/78 cases could not be diagnosed on FNAC. Thus, in our study diagnostic accuracy of FNAC for non neoplastic nodular skin lesions came to be 71.8 %.

Of the total 75 Benign nodular skin lesions, 61 cases were cytologically consistent with histopathology while 14 cases were inconsistent. All cases of nodular fasciitis, chondroid syringoma, giant cell tumor of tendon sheath were correctly diagnosed by FNAC. 50/53 cases of lipoma were correctly diagnosed while 3 wrongly diagnosed cases on FNAC were 2 cases of hibernoma and 1 non diagnostic case. Out of all cases of spindle cell lesions, 3 cases of neurofibroma, 2 cases of schwannoma and 2 cases of nodular fasciitis were incorrectly diagnosed as benign spindle cell lesions on FNAC. Out of benign adnexal tumors diagnosed on

FNAC, 2 cases of pilomatricoma were wrongly diagnosed as epidermal inclusion cyst. While 1 case each of trichoblastoma, sebaceous adenoma, dermal duct tumor and trichilemmoma were wrongly diagnosed as benign adnexal tumor on FNAC. On histopathology out of these 75 cases 61/75 were correctly diagnosed on FNAC while 14/75 cases could not be diagnosed on FNAC. Thus, in our study diagnostic accuracy of FNAC for Benign nodular skin lesions came to be 81.3%.

Overall, out of 8 cases of malignant nodular skin lesions 4 cases were correctly diagnosed on FNAC were confirmed on histopathology. All cases of MPNST, malignant melanoma and mucin eccrine adenocarcinoma were correctly diagnosed on FNAC. Whereas, 1 case each of malignant adnexal tumor (nodular hidradenocarcinoma) and basal cell carcinoma were wrongly diagnosed as benign adnexal tumor. 1 case of keratinizing squamous cell carcinoma was wrongly diagnosed as branchial cleft cyst and lastly myxoid liposarcoma was misdiagnosed as benign nerve sheath tumor on FNAC. On histopathology out of these 8 cases 4/8 were correctly diagnosed on FNAC while 4/8 cases could not be diagnosed on FNAC. Thus diagnostic accuracy of FNAC malignant nodular skin lesions came to be 50%.

Overall diagnostic accuracy of FNAC in diagnosing nodular skin lesions in the present study came to be 77.7%.

Table 1: Diagnostic Accuracy Of Fnac In The Present Study

Comparison	Frequency	Percentage
Histopathological Diagnosis And Fnac		
Consistent	125	77.7%

In Consistent	36	22.3%
Total Cases Studied	161	100%

Discussion

A total of 161 cases of nodular skin lesions were studied over a period of 2 year in our study. The age range of patients was 3 years to 82 years with a mean age of 34.7 years. Maximum number of cases were found to be in 31-40 years comprising of 22.9% of the study population while minimum number of cases in age group of >70 years (2.4%). In a study conducted by Jain et al. the mean age was reported as 43.5 years but regarding the age group having maximum frequency of cases,⁷ it corroborated with our study. Study conducted by Singh S et al observed maximum number of patients in the age group of 41–50 years.⁵

Male population outnumbered females with a male:female ratio of 1.98:1 in our study. In accordance to our study Patel S⁶ also reported male predominance in their study with a male to female ratio of 1.2:1.

In our study diagnostic accuracy of FNAC for non neoplastic nodular skin lesions came to be 71.8 %. Among non neoplastic nodular lesions epidermal inclusion cyst was the most common lesion encountered. These results are in accordance with the study by Patel S et al⁶ and Butler ED et al⁸ and Bhowmik et al⁹. They reported that epidermal inclusion cysts are frequently subjected to FNAC mainly to confirm the clinical diagnosis. FNAC features correlated well with the studies done by Eimani et al¹⁰ and Shet TM et al¹¹.

In our study 5 cases of trichilemmal cyst and 9 cases of dermoid cyst were misdiagnosed earlier as epidermal inclusion cyst. 2 cases namely pilomatricoma were also misdiagnosed as epidermal inclusion cyst. Similarly,

Bhowmik A et al⁹ also reported two cases of pilomatricoma which were misdiagnosed as epidermal inclusion cysts. They explained this on basis that the main reasons behind the erroneous diagnosis was the selective sampling of squamous cells. Their findings were in concordance with another previous study by Bansal et al¹² who also reported similar results.

In yet another study by Bhadani et al¹², 5 cases of Pilomatricoma were diagnosed as epidermal inclusion cyst & skin appendageal tumor of undetermined origin. In all the cases FNAC established epithelial nature of the lesion, excluding clinically mimicking inflammatory / neoplastic lesion of other origin.

All cases of gouty tophus, ganglion cyst and epidermal inclusion cyst were correctly diagnosed on FNAC. In similarity to ours 100% diagnostic accuracy for epidermal inclusion cyst has been reported by Sabir F et al¹³ in their study.

Further, pyogenic granuloma, actinomycosis and 1 case of lepromatous leprosy were wrongly diagnosed as suppurative pathology on FNAC. Rest 1 case of lepromatous leprosy, lupus vulgaris and infected sebaceous cyst were wrongly diagnosed as inflammatory pathology. Thus FNAC could not be diagnostic in these lesions and finally they were diagnosed histopathologically.

In the present study, one case of histopathological diagnosis of actinomycosis was recorded which showed acute inflammatory cell infiltrate and epithelioid cell granulomas in a proteinaceous background on FNAC. Actinomycosis was confirmed subsequently on histopathological examination only. In consensus to our results Patel S et⁶, and Bhatia A et al¹⁴. noted similar findings on FNA cytology of actinomycosis. Further in the study of benign nodular skin lesions, diagnostic

accuracy of FNAC for benign nodular skin lesions came to be 81.3%.

The most common lesions observed in benign nodular skin lesions were lipomas comprising of 70.6% cases. Gupta R et al¹⁵ also reported that the most common lesions observed in their study were lipomas (38%). This finding shows consonance with the fact that lipoma is the most common tumor seen in a community-based FNAC practice. In our study 94.3% diagnostic accuracy was achieved in diagnosing lipomas. Over all 3 cases out of 53 total cases of lipoma were wrongly diagnosed on FNAC. 2 cases were diagnosed as hibernoma and 1 was non diagnostic on FNAC. Patel S et al⁶ also reported 100% accuracy for diagnosing lipomas. On contrary, Singh S. et al⁵ reported 87.50% diagnostic accuracy for lipomas.

Spindle cell lesions were second most common lesions observed (n=11) followed by benign adnexal tumors in our study. 54.5% diagnostic accuracy (6/11 cases) was achieved in diagnosing spindle cell lesions. Out of all cases of spindle cell lesions, 3 cases of neurofibroma, 2 cases of schwannoma and 2 cases of nodular fasciitis were incorrectly diagnosed as benign spindle cell lesions on FNAC.

We observed 100% diagnostic accuracy was observed in diagnosing nodular fasciitis, chondroid syringoma, giant cell tumor of tendon sheath by FNAC. Out of benign adnexal tumors diagnosed on FNAC, 2 cases of pilomatricoma were wrongly diagnosed as epidermal inclusion cyst. Shet T et al. and Rege J¹¹ stated that the exact subtyping of the skin adnexal tumour on FNAC may not always be essential. In our study 2 cases of benign adnexal tumors as diagnosed on FNAC came out to be 1 case of malignant adnexal tumor and 1 case of basal cell carcinoma on histopathology.

Diagnostic accuracy of FNAC for malignant nodular skin lesions came to be 50% in our study. Less number of malignant cases can be justified on the basis that suspicious malignant lesions were directly sent for biopsy because the role of FNAC is limited in these cases.

Study done by LJ Leyfield et al¹⁶ on FNAC of soft tissue tumors with comparative histopathology showed the diagnostic sensitivity of FNAC for detecting malignant neoplasm was 95%.

Overall diagnostic accuracy of FNAC in diagnosing nodular skin lesions in the present study came to be 77.7%. Siddiqui et al¹⁷ reported an accuracy of FNAC was 46.7% and histopathology was 100%. Similar result was reported by Soni et al when evaluated the neck mass. Singh S et al⁵ reported a diagnostic accuracy of FNAC in benign nodular lesions was 77.77%. while diagnostic accuracy of malignant lesions was 66.66%.

Conclusion

The results of our study conclude that, FNAC is a simple, fast and economical technique and quite good accuracy rates in diagnosing nodular skin lesions. It will provide definite diagnosis in majority of cases especially benign nodular skin lesions including lipoma, ganglion cysts and giant cell tumors of tendon sheath and even majority of cases of non neoplastic nodular skin lesions. But its accuracy for malignant nodular skin lesions was questionable. For diagnosis in these cases we had to depend completely upon histopathological examination.

Acknowledgment: I am also thankful to Principal, Government Medical College, Haldwani, Nainital, Uttarakhand given this opportunity.

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