International Journal of Biomedical Research
ISSN: 0976-9633 (Online); 2455-0566 (Print)
Journal DOI: https://doi.org/10.7439/ijbr
CODEN: IJBRFA

Original Research Article

Cyto-histopathological and clinical evaluation of neoplastic lesions of skin: A pathologist's perspective

Pooja Chauhan*, Kavita Mardi, Neelam Gupta, Anita Negi and Ganga Sharma

Department of Pathology, Indira Gandhi Medical College, Shimla, HP, India

QR Code

***Correspondence Info:**
Dr. Pooja Chauhan,
Senior Resident
Department of Pathology,
Indira Gandhi Medical College, Shimla, HP, India

***Article History:**
Received: 09/05/2017
Revised: 11/05/2017
Accepted: 22/05/2017
DOI: https://doi.org/10.7439/ijbr.v8i5.4154

Abstract

Aim: To evaluate the efficacy and diagnostic accuracy of various cytological techniques in evaluation of neoplastic lesions of skin.
Materials and methods: Fine needle aspiration cytology of lesions with clinical suspicion of neoplasia. Giemsa stainining of cytology smears. Biopsy of lesions where possible.
Result: 24 patients (indoor/outdoor) with clinical diagnosis of neoplastic skin lesions were subjected to cytological examination and biopsy. Aspiration was inadequate in 2 cases. Sensitivity, specificity, diagnostic accuracy of cytological evaluation of neoplastic skin lesions were 91.67%, 100%, 97.44% respectively.
Conclusion: Cytological examination is a very simple and useful modality, requires minimum equipments and can be performed in outpatient clinic. The procedure is safe, free from complications and is well tolerated by patients.
Keywords: Cytology, neoplastic lesion, skin.

1. Introduction

Skin is the largest organ in the body weighing over 5 kg in a 70-kg individual and covering a surface area approaching $2m^{2.}$. Human skin consists of stratified, cellular epidermis and an underlying dermis of connective tissue. The epidermis is mainly composed of keratinocytes. Other cells in the epidermis are the melanocytes, langerhans' cells and merkel cells. Human skin also contains pilosebaceous follicles and sweat glands.[1]

Skin tumors especially malignant tumors, is one of the health problems in community which is quite important, although mortality is low. Based on the classification of WHO in 2003 skin tumors are grouped into – keratinocytic tumors, melanocytic tumors, appendageal tumors, haematolymphoid tumors, soft tissue tumors and neural tumors.[2]

Early diagnosis and timely management is prime concern of dermatologists in cases of neoplastic conditions affecting skin as complete excision can cure all patients.[3]

Cytological techniques have been under utilised in evaluation of skin lesions though the skin lends itself to cytological examination more readily than any other organ. Infact the ease with which skin biopsy can be obtained usually favours histological examination, rendering cytology superfulous.[4]

The main indications for FNB are rapid, non-invasive investigation of suspected metastatic malignancy and distinction between neoplasia and a reactive process likely to resolve spontaneously or respond to conservative treatment.[5,6] Thus cytology as a supplement to history and clinical findings can be useful in the management of patients with skin tumors. In patients with known malignancy, the nature of any nodules or thickenings related to surgical scars or elsewhere in the skin or subcutis, distinction can easily be made between suture granuloma, infection or other reactive process and recurrent or metastatic tumor. The possibility of a second primary or of

de-differentiation of the original tumor can also be decided by cytology.[7]

1.1 Aims and objectives

To evaluate the efficacy and diagnostic accuracy of various cytological techniques in neoplastic lesions of skin and to correlate the cytological, histopathological and clinical findings of neoplastic lesions of skin.

2. Materials and methods

A prospective study was conducted in the Department of Pathology and Dermatology, Indira Gandhi Medical College, Shimla (HP). The samples for cytological and histopathological examination were collected from the indoor and outdoor patients of all ages with neoplastic lesions of the skin attending the department of Dermatology, IGMC, Shimla.

Complete clinical data was recorded and proforma was filled out after taking a written informed consent from the patient. However patients who were unable to provide written informed consent were excluded. The study was conducted for duration of one year (2013 Dec- Dec 2014). Skin scraping for superficial lesions, slit skin smears for flat lesions, FNAC for skin nodules were done. Giemsa stain for cytological samples and Haematoxylin and Eosin stain for biopsy was performed. Validation of cytology diagnosis was done on the basis of histopathological diagnosis.

3. Result

Total 24 patients with clinical suspicion of neoplastic lesions of skin were subjected to cytological evaluation followed by biopsy. However cytological diagnosis could be made in only 22 cases as aspirate was inadequate in 2 cases. Maximum patients (66.66%) with neoplastic lesions were in the age group of 51-80 years. The mean age of presentation of neoplastic lesion was 58.21 years. Slight female predominance was noticed for neoplastic lesions with female to male ratio of 1.18:1. In the present study neoplastic lesions mostly presented as a nodule (66.66%) though plaque like and verrucous lesions were also a clinical presentation. Primary malignant tumors most commonly involved face and neck (90.0%)) while benign lesions involved extremities (80%). Cutaneous metastasis was seen maximally to trunk (44.4%). Spectrum of lesions has been shown in the Table 1, 2, 3.

Table 1: Spectrum of neoplastic lesions on cytology (n=24)

Neoplastic lesions	No. of cases	Percentage
1. Benign	05	20.8%
2. Primary malignant	09	37.5 %
3. Metastatic	08	33.3 %
4. Inadequate	02	8.3%
Total	24	100%

Table 2: Result of benign lesions of skin on cytology (n=5)

Cytological diagnosis	No. of cases	Percentage
Benign appendigeal tumor	01	20%
Benign spindle cell neoplasm	02	40%
Schwannoma	01	20%
GCT of tendon sheath	01	20%
Total	05	100%

GCT= giant cell tumor

Table 3: Result of malignant lesions on cytology (n=17)

Category	No. of cases	percentage
Primary malignant	**09**	**52.94%**
BCC	04	23.52%
SQCC	02	11.76%
Amelanotic melanoma/ anaplastic carcinoma	01	5.88%
ALCL	01	5.88%
Small round cell neoplasm possibly Merkel cell carcinoma	01	5.88%
Metastatic malignant	**08**	**47.05%**
metastatic adenocarcinoma	03	17.64%
metastatic squamous cell carcinoma	02	11.76%
metastatic duct cell carcinoma	02	11.76%
metastatic undifferentiated large cell carcinoma	01	5.88%
Total	**17**	**100%**

Comparison of cytology and histopathology with statistical analysis of the results obtained on cytohistological correlation has been depicted in Table 4, 5.

Table 4: Neoplatic lesions 0f skin: cytology vs histopathology (n=22)

Cytological diagnosis	No. of cases	Histopathological diagnosis	No. of cases
Benign appendigeal lesion	01	Eccrine poroma	01
Benign spindle cell neoplasm	02	Dermatofibroma Fibrolipoma	01 01
Schwannoma	01	Schwannoma	01
GCT of tendon sheath	01	GCT of tendon sheath	01
BCC	04	BCC	04
SqCC	02	SqCC	02
Amelanotic melanoma/anaplastic carcinoma	01	Amelanotic melanoma	01
Small round cell neoplasm possibly merkel cell carcinoma	01	Merkel cell carcinoma	01
ALCL	01	ALCL	01
Metastatic adenocarcinoma	03	Metastatic adenocarcinoma	03
Metastatic sq. cell carcinoma	02	Metastatic sq. cell carcinoma	02
Metastatic duct cell carcinoma	02	Metastatic duct cell carcinoma	02
Metastatic large cell undifferentiated carcinoma	01	Metastatic large cell undifferentiated carcinoma	01

Table 5: Comparison of cytology and histopathology

	TP	TN	FP	FN
Neoplastic lesions	22	54	0	2

The 22 cases reported as neoplastic lesions on cytology correlated with histopathology and while in 2 cases where cytology failed to yield adequate material for diagnosis were reported as BCC and metastatic squamous cell carcinoma on histopathology. Senstivity, specificity and diagnostic accuracy for neoplastic lesions were calculated which were 91.67%, 100%, 97.44% respectively

4. Discussion

Cytological evaluation is not very popular in the diagnosis of primary skin tumors because many clinicians prefer to investigate a skin lesion by excision biopsy since it is easily approachable. Also, there is a wide variety of skin adnexal tumors, and even in histologic sections the exact diagnosis requires experience in this field. Therefore, there are a few scattered case reports and occasional large studies on cytological evaluation of primary skin tumors.

The neoplastic lesions of skin were broadly grouped into benign tumor, malignant tumors. Malignant skin lesions were further grouped as primary and metastatic skin lesions.

The mean age of presentation for neoplastic lesions was 58.6 years with an age range of 28-85 years which was similar to age range of 10-78 years observed by Dey *et al*[8]. In present study slight female predominance was seen for cutaneous neoplasms with female to male ratio of 1.18:1 in contrast to 1:2 sex ratio observed by Dey *et al*[8]

Single case of benign appendigeal neoplasm and 2 cases of benign spindle cell neoplasm could not be categorized on cytology could not be classified on cytology and were confirmed as eccrine poroma while two cases of benign spindle cell neoplasm were diagnosed as dermatofibroma and fibrolipoma. Dey *et al*[8] also found it difficult to classify five case of benign appendigeal tumor on cytology alone. To determine the exact type of tumor, histopathological examination of the excisional biopsy was recommended by Layfield and Glasgow [9].

One case of GCT of tendon sheath on cytology and correlated with histopathology. According to Wakely *et al*[10] and Hamdi *et al*[11] the diagnosis of GCT of tendon sheath can be made or at least strongly suggested using FNAB when the cytologic and clinical features are combined.

Most common primary malignant neoplasm encountered was BCC with 5 cases, (50%) followed by squamous cell carcinoma (20%). Kusumastuti *et al*[12], Daskalopoulou *et al*[13] and Erylimaz *et al*[14] also found BCC to be the most common primary cutaneous tumor in their study. Comparing to histopathological results, cytodiagnosis of BCC showed 100% senstivity and specificity in present study. Kassi *et al*[15] and Naraghi *et al*[16] observed high senstivity and specificity in the diagnosis of BCC similar to our present study.

1case diagnosed as merkel cell carcinoma on histopathology was diagnosed as small round cell neoplasm on cytology with possibility of MCC Immunohistochemistry was positive for NSE establishing neuroendocrine origin of tumor. Collins *et al* [17] concluded from their study that the diagnosis of MCC of the skin by FNA can be made by applying cytologic features in addition to ancillary studies and clinical information

One case was diagnosed as primary ALCL in a male presenting as ulcerated mass neck. Bone marrow aspiration and biopsy was within normal limit, also patient had no palpable lymph nodes. The diagnosis of ALCL was supported by CD 30 positivity on IHC. Singh S] *et al*[18 observed that primary cutaneous anaplastic large cell lymphoma can be diagnosed on imprint smears due to its characteristic morphological features and advocated histopathological and immunohistochemical studies for confirmation. In present study maximum cases of cutaneous metastasis were from lung (3 cases, 33.33%) which was similar to Srinivasan *et al*[19].

In present study sensitivity, specificity and diagnostic accuracy was 91.67%, 100%, 97.44% respectively. Kusumastuti *et al* [12] observed senstivity, specificity and diagnostic accuracy of 94.92%, 98.80% and 96.52% respectively for cytology in skin tumors while Sabir *et al* [20] reported 88.9% sensitivity for cytology (FNAC) in diagnosing various neoplastic lesions.

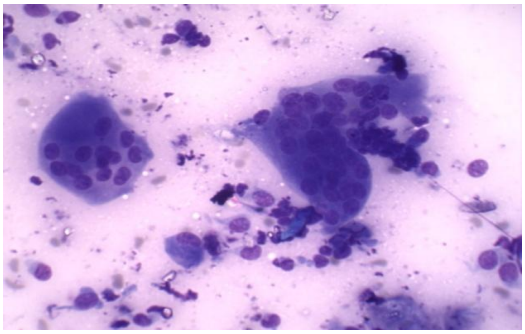

Fig 1: GCT of tendon sheath. Giemsa, 40 X

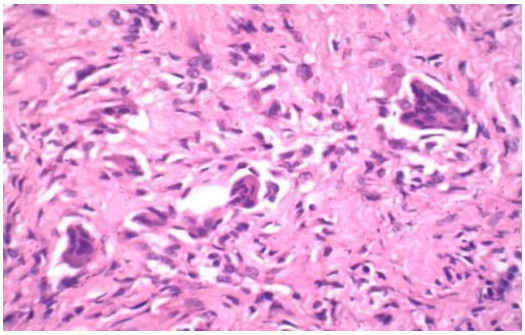

Fig 2: GCT of tendon sheath. H&E,40X

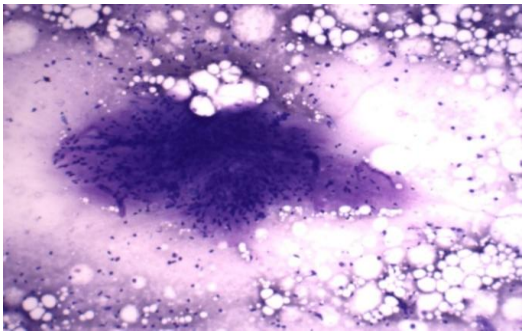

Fig 3: Schwannoma. Giemsa, 10X

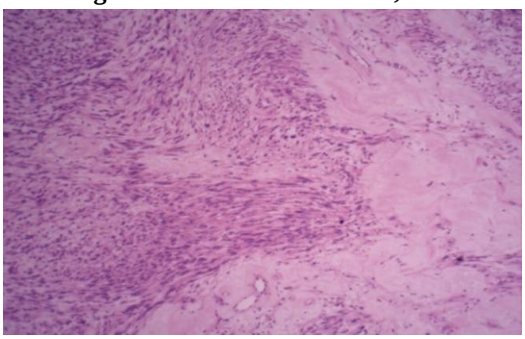

Fig 4: Schwannoma. H&E, 10X

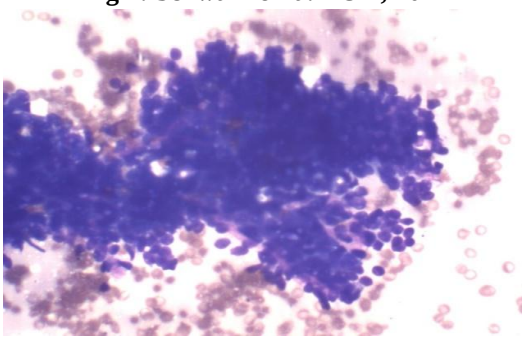

Fig 5: Benign adnexal neoplasm. Giemsa,40X

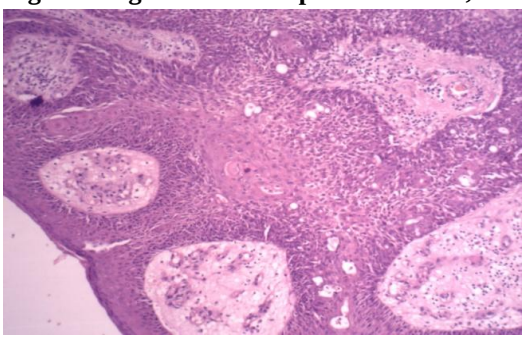

Fig 6: Eccrine poroma. H&E, 10X

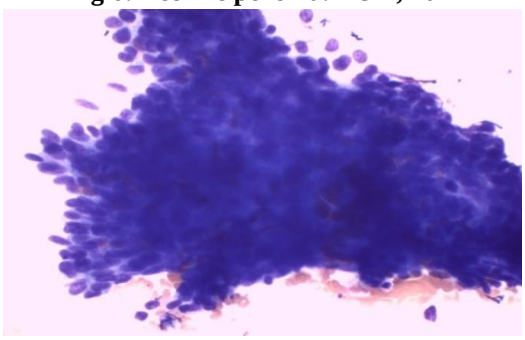

Fig 7: BCC. Giemsa, 40X.

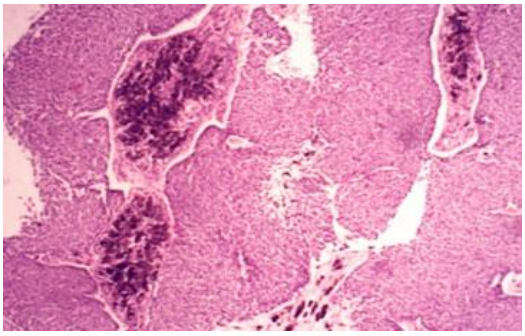

Fig 8: Pigmented BCC. H&E, 10X

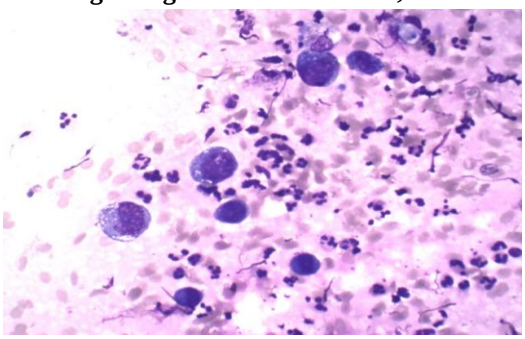

Fig 9: Anaplastic large cell lymphoma. Giemsa, 40X

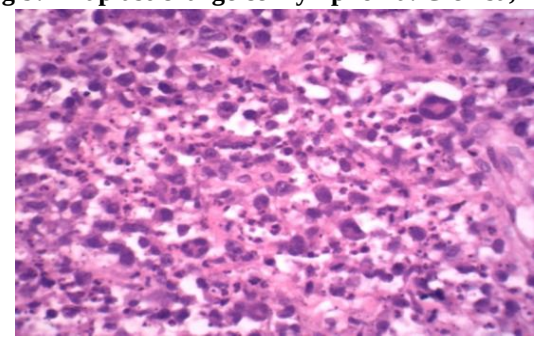

Fig 10: Anaplastic large cell lymphoma. H&E,40X

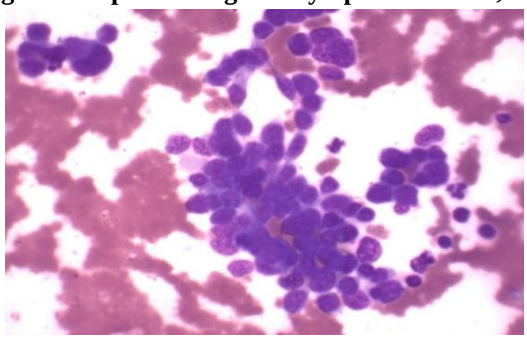

Fig 11: Merkel cell carcinoma. Giemsa 40X

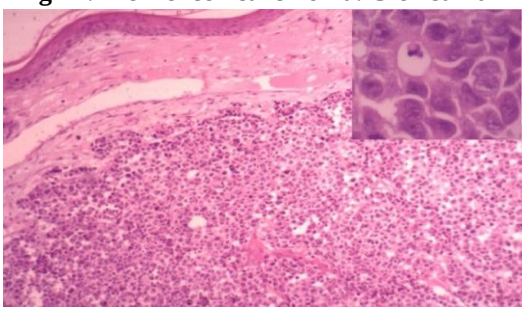

Fig 12: Merkel cell carcinoma. H&E, 10X. Inset: H&E, 100X

5. Conclusion

Cytological examination is a very simple and useful modality, requires minimum equipments and can be performed in outpatient clinic. In many instances cytology can exclude or confirm malignancy and help to outline surgical management. Cytology can support the diagnosis of metastasis in case of a known primary and offer a clue to underlying malignancy in case of an occult primary. Larger studies on skin adnexal tumors are required for better identification of skin adnexal tumors on cytology. Despite the usefulness of the procedure inadequate aspirate remains a significant limitation necessitating biopsy in such cases.

References

[1]. McGrath JA, Uitto J. Anatomy and Organization of Human Skin. In Burns DA, Breathnach SM, Cox NH, Griffiths CEM editors. Rook's Textbook of Dermatology, 8th edition. Blackwell; 2010 p 3.1-3.2

[2]. LeBoit PE, Burg G, Weedon D, Sarasin A. The WHO classification of skin tumours. Pathology & Genetics Skin Tumours, Lyon, IARC Press.

[3]. Sonu Jain, Sachin Rastogi, Vinay Sharma. Role of Fine-Needle Aspiration Cytology in Evaluation of Malignant Skin Lesions. *Int J Med Res Prof.* 2016, 2(2); 324-27

[4]. Ruocco E, Brunetti G, Vecchio MD, Ruocco V. The practical use of cytology for diagnosis in dermatology. J Eur *Acad Dermatol Venereol*. 2011; 25(2):125-9.

[5]. Reyes CV, Thompson KS, Jensen JD, Choudhury AM. Metastasis of unknown origin: the role of fine-needle aspiration cytology. *Diagn Cytopathol* 1998; 18:319–22.

[6]. Spitz DJ, Reddy V, Selvaggi SM, Kluskens L, Green L, Gattuso P. Fine-needle aspiration of scalp lesions. Diagn. Cytopathol 2000; 23: 35–38.

[7]. Orell SR, Domanski H. Skin and subcutis. In Orell SR and Sterrett GF (eds). Orell and Sterrett "s Fine needle aspiration cytology, 4th ed. Philadelphia, Elsevier Churchill Livingstone; 2012:370-86.

[8]. Dey P, Das A, Radhika S, Nijhawan R. Cytology of primary skin tumors**.** *Acta Cytol*.1996 Jul-Aug; 40(4):708-13.

[9]. Layfield LJ, Glasgow BJ. Aspiration biopsy cytology of primary cutaneous tumors. *Acta Cytol*.1993; 37:679-88.

[10]. Wakely PE Jr, Frable WJ. Fine needle aspiration biopsy cytology of giant cell tumor tendon sheath. *Am J Clin Pathol*.1994; 102:87-90.

[11]. Hamdi MF, Touati B, Zakhama A. Giant cell tumor of the flexor tendon sheath of the hand: analysis of 27 cases. *Musculoskelet Surg.* 2011; 2:112-6.

[12]. Kusumastuti EH, Rahniayu A. Cytological diagnostic accuracy in skin tumor. *Folia Medica Indonesiana*. 2013; 49(1): 66-71.

[13]. Daskalopoulou D, Maounis N, Kokalis G, Liodandonaki P, Belezini E, Markidou S. The role of fine needle aspiration cytology in the diagnosis of primary skin tumors. *Archives d'Anatomie et de Cytologie Pathologiques*. 1993; 41(2): 75-8.

[14]. Eryılmaz A, Durdu M, Baba M, Yıldırım FE. Diagnostic reliability of the Tzanck smears. *International Journal of Dermatology*. 2014; 53:178–186.

[15]. Kassi M, Kasi PM, Afghan AK, Marri SM, Kassi M, Tareen I. The Role of Fine-Needle Aspiration Cytology in the diagnosis of Basal Cell Carcinoma. *ISRN Dermatology*, 2012.

[16]. Naraghi Z, Ghaninejad H, Akhyani M, Akbari D. Cytological diagnosis of cutaneous basal cell carcinoma. *Acta Med Iran* 2005; 43:50-4.

[17]. Collins BT, Elmberger PG, Tani EM, Bjornhagen V, Ramos, RR. Fine-needle aspiration of Merkel cell carcinoma of the skin with cytomorphology and immunocytochemical correlation. *Diagn. Cytopathol* 1998; 18: 251–257.

[18]. Singh S, Gupta N, Tekta GR. Imprint cytology facilitating the diagnosis of primary cutaneous anaplastic large cell lymphoma of iliac fossa. *Journal of Cytology*. 2012; 29(4): 267-269.

[19]. Srinivasan R, Ray R, Nijhawan R. Metastatic cutaneous and subcutaneous deposits from internal carcinoma: an analysis of cases diagnosed by fine needle aspiration. *Acta Cytol*. 1993; 37:894-8.

[20]. Sabir F, Aziz M, Afroz N, Amin S. Clinical and cytohistopathological evaluation of skin lesions with special reference to bullous lesions. *Indian J Pathol Microbiol.* 2010; 53: 41-46.