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

Role of cytology in evaluation of infectious lesions of skin: A Cyto-histopathological correlation

Pooja Chauhan*, Neelam Gupta, Kavita Mardi, Sandhya Chauhan, Shivani Sood and Anita Negi

Department of Pathology, Indira Gandhi Medical College, Shimla, H.P., India

QR Code

***Correspondence Info:**
Dr. Pooja Chauhan,
Senior resident,
Department of Pathology,
Indira Gandhi Medical College, Shimla, H.P., India

***Article History:**
Received: 05/11/2017
Revised: 14/11/2017
Accepted: 14/11/2017
DOI: https://doi.org/10.7439/ijbr.v8i12.4451

Abstract

Aim: To evaluate the efficacy and diagnostic accuracy of various cytological techniques in evaluation of infectious lesions of skin.
Materials and methods: Fine needle aspiration and slit skin of lesions with clinical suspicion of infectious lesions of skin were done. Giemsa stainining of cytology smears. Biopsy of lesions where possible.
Result: 34 patients (indoor/outdoor) with clinical diagnosis of infectious skin lesions were subjected to cytological examination and biopsy was done in 32 of these cases. Aspiration was inadequate in 8 cases.
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, infectious lesion, skin.

1. Introduction

Skin is the largest organ in the body.[1] Various diseases afflicting the skin range from non-specific dermatoses and inflammatory diseases to neoplastic diseases of various components of the skin.[2] Skin infections include those caused by viruses, fungi, and bacteria or protozoan. At times, overgrowth of resident organisms may cause minor disease or non-residential bacteria may colonize the epidermis and lead rapidly to disease.[3]

Although the skin lends itself to cytological examination more readily than any other organ, cytodiagnosis is much less frequently used in dermatology than in other fields. [4]

Lesions with skin surface involvement can be evaluated by scrapping or touch preparations, while lesions forming masses can be sampled by FNAB.[3] The technique is minimally invasive, produces a speedy result and is inexpensive. [5]

1.1 Aims and objectives: To evaluate the efficacy and diagnostic accuracy of various cytological techniques in infectious lesions of skin and to correlate the cytological, histopathological and clinical findings of infectious 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 infectious 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 34 patients with clinical suspicion of infectious lesions of skin were subjected to cytological evaluation followed by biopsy except in 2 cases diagnosed as herpes zoster on cytology where biopsy was not done, so total 32 patients underwent biopsy. Cytological aspirate was adequate in 28 cases only.

In present study the mean age for clinical presentation with infectious lesions was 38.6 years with age of the patients ranging from 14- 66 years. Sex ratio was 1:1. Patients with infectious lesions most commonly presented with lesions on face and neck.

Of the 28 cases of infectious skin lesions yielding adequate material on cytology, bacterial lesions outnumbered other lesions with total of 11 lesions. Hansen's disease was the most common lesion reported, comprising of 10 (35.7%) cases followed by 7 (25%) cases of granulomatous dermatitis, 4(14.28%) cases of cutaneous leishmaniasis, 2 (7.14%) cases each of deep fungal infection and herpes infection, 1(3.57%) case each of lupus vulgaris and an abscess.(Table 1)

Table 1: Spectrum of infectious lesions on cytology (n=28)

Category	No. of cases	percentage
LL Hansen's disease	06	21.42%
BT Hansen's disease	04	14.28%
Lupus vulgaris (LV)	01	3.57%
Cutaneous leishmaniasis (CL)	04	14.28%
Deep fungal infection (CL)	02	7.14%
Herpes infection	02	7.14%
Abscess	02	7.14%
Granulomatous dermatitis(GD)	07	25.0%
Total	28	100%

Ten cases of Hansen's disease reported in the study were subcategorized according to the Ridley Jopling classification. 6 cases of LL type Hansen's disease revealed cellular smears, numerous foamy macrophages with few lymphocytes. 4 cases of BT Hansen's had fair cellularity with poorly cohesive granulomas. Modified ZN staining positive in all cases of LL Hansen's while AFB could be demonstrated in 2(50%) cases of BT Hansen's disease.

Single case of lupus vulgaris revealed well formed epithelioid cell granuloma. ZN staining for tubercle bacilli showed presence of AFB. Smears from 2 cases of deep fungal infection exhibited abundant neutrophils, macrophages, multinucleated giant cells and round to oval, PAS positive, intracellular and extracellular spores. 4 cases were diagnosed as cutaneous leishmaniasis on cytology based on the presence of numerous intracellular and extracellular LD bodies.

Tzanck smear from 2 cases of herpes infection revealed ballooning degeneration, multinucleated keratinocytes and acantholytic cells.

7 cases of non specific granulomatous dermatitis revealed epithelioid granuloma on microscopic examination. ZN staining, PAS and Giemsa staining failed to reveal any specific pathology in these cases.

The spectrum of 32 infectious lesions on who underwent histopathology subsequently is depicted in table 2.

Table 2: Spectrum of infectious lesions on histopathology (n=32)

Category	No. of cases	Percentage
LL Hansen	06	18.75%
BT Hansen	05	15.62%
BL Hansen	01	3.12%
LV	02	6.24%
Deep fungal	04	12.5%
CL	06	18.75%
GD	08	25%
TOTAL	32	100%

Cytohistological correlation has been depicted in Table 3.

Table 3: Cytohistological correlation for infectious lesions of skin (n=28):

Cytological diagnosis	No. of cases	Histopathological correlation	No. of cases
LL Hansen's	6	LL Hansen	6
BT Hansen's	4	BT Hansen	4
LV	1	LV	1
Deep fungal	2	Deep fungal	2
CL	4	CL	4
GD	7	GD	7
Herpes	2	-	-
Abscess	2	Metastatic squamous cell carcinoma CL	1 1

One case diagnosed as abscess on cytology was diagnosed as a case of cutaneous leishmaniasis on histopathology. One false negative case diagnosed as an abscess on cytology was diagnosed as case of metastatic squamous cell carcinoma on histopathology.

Of 6 cases with inadequate material on cytology were found to be 1 case each of lupus vulgaris, BL and BT Hansen, cutaneous leishmaniasis, BCC, granulomatous dermatitis indicating that the yield of cytological evaluation depends on the expertise of obtaining cytological sample (Table 4).

Table 4: Spectrum of inadequate cases on histopathology (n=8)

01	Lupus vulgaris
01	BL Hansen
01	BT Hansen
02	Deep fungal
01	Granulomatous dermatitis
01	Cutaneous leishmaniasis

However 3 of 8 cases of granulomatous dermatitis revealed suppurative granulomas on microscopic examination and were advised fungal cultures which were subsequently found to be positive for sporotrichosis. 3 cases with a strong suspicion of *lupus vulgaris* were found to be

positive for mycobacteria on PCR from an external source. Rest 2 cases of granulomatous dermatitis with clinical suspicion of cutaneous leishmaniasis were advised culture studies but were lost to follow up.

4. Discussion

In present study most of the infectious lesions were encountered in the age group of 31- 40 years; mean age was 38.6 years with patient age ranging from 14-66 years. Similar observations were seen in a study by Singh S *et al*[6] who encountered maximum infectious lesions in the age group of 31-40 years with an age group of 6-65 years.

Among 34 cases of infectious lesions, maximum numbers of cases were accounted by Hansen's disease (12 cases, 35.29%). Similar findings were reported by Singh S *et al* [6] who found 42 cases (60%) of Hansen's disease among 70 cases of infectious lesions studied.

We have followed the criteria laid down by R-J in reporting cytology smears. [7]

It was observed that it was possible to sub-classify Hansen's disease on cytology. Six of 12 cases were diagnosed as lepromatous types by numerous foamy macrophages and few lymphocytes; an observation similar to study by Prasad *et al* [8].

Four cases of BT Hansen's disease were accurately diagnosed on cytology. 2 cases reported as inadequate on cytology were reported as BL and BT Hansen's disease on histopathology. However no case of TT and BB Hansen's disease was seen by us. Studies by Singh *et al* [6] and Prasad *et al* [8] also sub classified Hansen's disease on cytomorphology.

Sensitivity of cytological smear in detection of LD bodies was 80% taking detection of LD bodies on HPE as gold standard. In their study Mashood *et al* [9] concluded that HPE is statistically superior investigation than slit skin smear in cutaneous leishmaniasis and similar observation was made by us. However precise sampling and expertise in sample taking is a limiting factor in cytological smears.

Two cases with clinical diagnoses of herpes zoster were evaluated with Tzanck smear however no biopsy correlation was available. We could not distinguish between herpes zoster and herpes simplex infection as both showed similar cytological findings revealing characteristic multinucleated syncytial giant cells and acantholytic cells. Similar observations were made by Sabir *et al* [2].

In 8 cases with clinical suspicion of infectious etiology, granulomatous reactions were reported. ZN staining, PAS and AFB were negative in these cases. However 3 of 7 cases of granulomatous dermatitis revealed suppurative granulomas on microscopic examination and were advised fungal cultures which were subsequently found to be positive for sporotrichosis. 3 cases with a strong suspicion of lupus vulgaris were found to be positive for mycobacteria on PCR from an external source. Rest 2 cases of granulomatous dermatitis with clinical suspicion of cutaneous leishmaniasis were advised culture studies but were lost to follow up.

Cytology is valuable in the diagnosis of inflammatory, infectious and degenerative conditions, a definitive 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. [5]

5. Conclusion

The role of cytology in diagnosis of skin lesions is controversial because they are easily available for excision. However with the ever increasing use of cytological procedures in clinical practice there is a need for detailed cytological description of the spectrum of various skin lesions and the problems during cytodiagnosis.

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]. 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.

[3]. Lin O, Zakowski MF. Cytology of soft Tissue, bone, and skin. In Bibbo M, Wilbur D C, editors. Comprehensive cytopathology, 3rd ed. Philadelphia: Saunders Elsevier; 2008: 502.

[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]. Orell SR, Sterrett GF. Introduction. In Orell SR and Sterrett GF (eds). Orell and Sterrett's Fine needle aspiration cytology, 4th ed. Philadelphia: Elsevier Churchill Livingstone; 2012:41-77.

[6]. Singh S, Mohan A, Kushwaha P. Clinical and cytohistopathological evaluation of inflammatory skin lesions in and around Muzaffarnagar district. *Indian Journal of Basic and Applied Medical Research*; 2015; 4(2): 87-92.

[7]. Ridley DS. Histological classification and the immunological spectrum of leprosy. *Bull World Health Organ*.1974; 51(5):451-65.

[8]. Prasad PVS, George RV, Kaviarasan PK, Viswanathan P, Tippoo R, *et al*. Fine needle aspiration cytology in leprosy. *Indian J Dermatol Venereol Leprol* 2008; 74:352-6.

[9]. Mashhood AA, Khan IM, Nasir S, Agha H, Saleem M, Imran A. Fine needle aspiration cytology versus histopathology in the diagnosis of cutaneous leishmaniasis in Pakistan. *J Coll Physicians Surg Pak.* 2005; 15:71–3.