International Journal of Sciences & Applied Research

www.ijsar.in

TZANCK smear: A useful diagnostic tool in Dermatology - a study

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Abstract

Aim: This study attempts to illustrate the importance of Tzanck smear and its clinico-pathological correlation.

Methods: The material for this study constituted patients selected from the Department of DVL, NRI Medical College and General Hospital, Chinakakani, Guntur from January 2014 to November 2015.

Results: The study group comprised of 82 females and 90 males, a total of 172 patients. M:F=1.09:1. Majority of patients belonged to 40 and above age group. Herpes group constituted the largest group with 74.41%, followed by Pemphigus group with 13.95%, and Bullous Impetigo with 2.9%. Out of the 128 cases included in the Herpes group, 80 patients belonged to Herpes zoster, 26 patients to Herpes simplex, 22 patients to varicella.

Conclusion: In the present study, the number of acantholytic cells was proportional to the disease activity. Patients on maintenance therapy with corticosteroids have shown fewer number of acantholytic cells compared with freshly diagnosed cases. This study is perfectly in literary and scientific confirmation of the figures and facts already provided by a few other similar workers in the field of Dermatology in India. Cytodiagnostic procedure like Tzanck smear was observed to be a simple but effective method of confirming the clinical diagnosis with accuracy in the present study.

Keywords: Acantholytic cell, multinucleate giant cell, Tzanck smear

Introduction

In 1947 Tzanck first published a report on the use of cytological studies which may aid in diagnosis of cutaneous lesions. In the present study's endeavor, cytology of various vesiculo bullous conditions and few other conditions was observed. The study was mainly based on Tzanck's procedure. The usefulness of this simple bedside procedure to confirm the diagnosis of the cutaneous conditions was analyzed in this study.

Advantages

Cytological study is a simple out patient procedure, done without advance preparation or anaesthesia. It is safe and virtually painless. Both procedure and interpretation are rapid with high accuracy. It is a cost constrained procedure. It is of

greatest value in viral and pemphigus group of disorders.

Disadvantages

Cytodiagnostic should not be regarded as substitute for biopsy which gives more complete information. It cannot be recommended as routine diagnostic investigation in malignant tumors for the following reasons: There is a risk of disseminating the cells during handling. It is difficult to distinguish between invasive tumor and carcinoma in situ. Older lesions and secondary changes in the lesions may mask the characteristic features of the lesions and hence of diagnosis. Inadequate material, defective technique and improper fixation may give false negatives.

Cytology

In many diseases of skin, changes occur in the cells which are characteristic of the disease. These abnormal cells can be classified from their site of origin as:

1) Cells derived from epidermis: a) Acantholytic cells b) Balloon cells c) Dyskeratotic cells d) Parakeratotic Cells e) Malignant cells

2) Cells derived from bone marrow: a) Granulocytic group b) Lymphocytic group c) Monocytes or Macrophages. In addition two types of cells from the dermis may participate in the cellular proliferation occurring in the inflammatory and granulomatous diseases. These are fibroblasts and mast cells. [1]

Aim

This study attempts to illustrate the importance of Tzanck smear and its clinico-pathological correlation.

Objectives

To study the various cutaneous dermatosis like:

- Immunobullous disorders: Pemphigus vulgaris, Pemphigus vegetans, Pemphigus foliaceus, Pemphigus erythematosus, Bullous Pemphigoid, etc.
- Drug Reactions: Toxic Epidermal Necrolysis, Steven Johnson Syndrome.
- Cutaneous infections: like Herpes simplex, Varicella, Herpes zoster, Molluscum contagiosum, pustular/bullous superficial fungal infections, Leishmaniasis, Staphylococcal Scalded Skin syndrome, Bullous impetigo.
- Geno dermatoses: Hailey – Hailey disease, Dariers disease.
- Cutaneous tumors: like Basal cell carcinoma, squamous cell carcinoma, etc. both with the help of Tzanck smear and histopathology.

Materials and methods

The material for this study constituted patients selected from the Department of DVL, NRI Medical College and General Hospital, Chinakakani, Guntur from January 2014 to November 2015, to study the usefulness of "Tzanck smear" as a rapid diagnostic aid.

Inclusion criteria

1. Subject of either sex/ any age will be included.
2. All the patients will be subjected to thorough clinical examination.
3. The result of Tzanck smear will be supported and confirmed by histopathology of the lesions.

Patients fulfilling inclusion criteria were selected for the study, consent was taken and detailed proforma was filled for each patient. All the patients were subjected to thorough clinical examination, routine haematological, serological and radiological investigations and special investigations like Tzanck smear and histopathology. The pathologist opinion was taken apart from basic laboratory investigations for confirmation of histopathology. All findings were tabulated and results were compared.

Procedure

Smears were taken by Tzanck's technique from vesiculo bullous lesions on glass slides from each patient.The roof of a recently formed blister is snipped with a pair of scissors. The blister fluid was allowed to drain; from the base of the blister, material was scraped with a cotton swab stick or the blunt end of scalpel and spread on a clean microscopic slide and allowed to dry. The slide is then stained with Giemsa stain and looked for acantholytic cells and inflammatory cells under light microscopy. The commercially available Giemsa Stain solution is diluted 1:10 with distilled water, and the diluted solution is poured over the smear and kept for 15 minutes. Then it is washed with water and examined under the microscope. The stained nuclei may vary in colour from reddish blue to purple to pink. The cytoplasm stains bluish**.**

Results

Age incidence

The age distribution of the patients is shown in the table below. See Table 1.

Table 1: Age distribution.

Age group in years	Number of Patients
Below 10	6
10-19	11
20-39	56
40 & above	99

Sex incidence

There are a total of 172 patients, out of whom 90 are males and 82 are females. M:F=1.09:1.

Clinical types

The patients were distributed into various clinical types of disorders. The percentage distribution of different clinical types in patients under study is shown in Table-2.

Herpes group constituted the largest group comprising of 74.41% of cases followed by Pemphigus group with 13.95% of cases, and then Bullous Impetigo with 2.9%. Scabies, Palmoplantar pustulosis, Hidradenitis suppurativa, Bullous SLE, Dermatitis herpetiformis constituted the rest of the cases.

Table 2: Clinical types.

Group	Total	Percentage
Pemphigus group	24	13.95
Pemphigus vulgaris	18	10.46
Pemphigus foliaceus	5	2.90
Pemphigus erythematosus	1	0.58
Bullous pemphigoid	4	2.32
Herpes group	128	74.41
Varicella	22	12.79
Herpes zoster	80	46.51
Herpes simplex	26	15.11
Molluscum contagiosum	6	3.48
Bullous impetigo	5	2.90
Scabies	1	0.58
Palmoplantar Pustulosis	1	0.58
Dermatitis Herpetiformis	1	0.58
Hidradenitis Suppurativa	1	0.58
Bullous SLE	1	0.58

Pemphigus group

Histopathologically they were diagnosed as Pemphigus vulgaris in 18 cases, Pemphigus foliaceus in 5 cases, Pemphigus erythematosus in one case. All the cases except for 3 cases of pemphigus vulgaris and 1 case of pemphigus foliaceus, have shown acantholytic cells in Tzanck smears from their lesions. They appeared as round cells with large hyper chromatic nucleus with condensation of cytoplasm and perinuclear halo. Smears from two patients with acute generalized onset of pemphigus have shown large clusters of acantholytic cells when compared to others. Smears from

early lesions showed eosinophils. Patients on maintenance therapy with corticosteroids have shown fewer number of acantholytic cells compared with freshly diagnosed cases. In few patients smears have shown predominantly eosinophilic infiltrate along with acantholytic cells. Classical acantholytic cells in varying numbers could be identified in Tzanck smears.

Viral infections group

Out of the 128 cases included in the study, 80 patients belonged to Herpes zoster, 26 patients to Herpes simplex, 22 patients to varicella. Most of the Herpes zoster patients belonged to above 30 years age group. Male to female ratio was 1.12 : 1. History of premarital sexual contact could be obtained in many cases of Herpes genitalis. Out of 80 patients of Herpes zoster, 68 patients showed characteristic cytological changes such as swollen epithelial cells, with margination of chromatin and blurring of nucleus, with multinucleated giant cells. Out of 22 patients of varicella, 12 patients showed typical cytological changes of multinucleated giant cells. In patients of Herpes simplex, lesions showed typical cytological changes of multi nucleated gaint cells in Tzanck smears in 20 of 26 cases. Out of 6 patients of Molluscum Contagiosum, 5 showed characteristic intra cytoplasmic inclusion bodies.

In five cases of Bullous Impetigo, Tzanck smears have shown marked polymorpho nuclear leucocytic infiltrate in 4 cases, out of which one case has also shown acantholytic cells (due to secondary acantholysis). One out of four cases of Bullous pemphigoid has shown eosinophils in Tzanck smear. Single cases, each of scabies, palmoplantar pustulosis, Dermatitis herpetiformis, Hidradenitis suppurativa, Bullous SLE showed neutrophils in Tzanck smear.

Discussion

In our study different viral infections like Varicella, Herpes zoster, Herpes simplex and Molluscum contagiosum were studied. Herpes zoster constituted the largest group.

Viral infections group

The frequency of Tzanck smear findings of multi nucleate gaint cells in different viral infections (Varicella, Herpes zoster, Herpes simplex) and Henderson-Peterson bodies in Molluscum Contagiosum in our study is compared with other Indian studies which is shown in Table-3.

The cellular changes were similar in all types of vesicular viral infections and could not be differentiated from each other. Folker et al (2003), Harney Blank et al (1951) in their study which included various types of Herpes simplex, Herpes zoster and Varicella noted characteristic epithelial cell changes but could not differentiate these disorders on the basis of cytology. No other vesicular lesions on the skin including those caused by other viruses manifested similar cytological changes in Tzanck smear. Gupta et al (2005), Henry Haber [1954] opinioned that findings of mono and multinucleated balloon cells in Tzanck smears can offer a cytological diagnosis of Herpes simplex, Herpes zoster and Varicella, although it is impossible to distinguish between these three conditions. [4] Goldman et al (1959), Stephen et al (2004) observed that cytological technique is of greatest value in diagnosis of Herpes group of disorders particularly in extra facial Herpes simplex and atypical presentations where in clinical features are not so obvious. [5] The present study confirms the findings of above workers.

Table 3: Comparison of our findings with other Indian studies.

Disease	Anjum Farhana et al [2]	Sailaja Prabhala et al [3]	Our Study
Varicella	46.7%	33.33%	54.5%
Herpes Zoster	47.4%	62.50%	85.00%
Herpes Simplex	42.9%	68.75%	76.90%
Molluscum Contagiosum	81.36%	50.00%	83.33%

Table 4: Tzanck smear showing acantholytic cells in Pemphigus group.

Pemphigus variant	Anjum Farhana et al [2]	Leena et al [12]	Our Study
Vulgaris	75%	81%	83.33%
Foliaceous	66.7%	78%	80.00%
Erythematosus	91.7%	80%	100%

Cytological examination of fresh material from the center of the lesions and demonstration of the molluscum bodies is a quick method of diagnosis as per Carteaud (1955), Black (2001), Gupta et al (2005). [6] Atypical presentation of Molluscum contagiosum lesions was also reported by Whitfield (1929), Somerville (1941), Hill (1949), Tanissa (1950), and Tobias (1951). In conclusion cytodiagnosis is an easy method of confirming the diagnosis of Molluscum contagiosum. [6, 7, 8] It is also helpful for examination of the patients after the removal of the lesions to determine whether the infection is still active.

In the present study, the number of acantholytic cells was proportional to the disease activity and Tzanck smear from the mucosal erosions demonstrated acantholytic cells which helped us to exclude other causes of chronic oral ulcers. Gupta et al (2005) in their study stated that Tzanck smear is a simple but effective method of confirming the clinical diagnosis of immunobullous disorders like Pemphigus. Gerald shklar et al (1970) in their study concluded that diagnosis of Pemphigus can be made by examining the oral smears and biopsies of the patients prior to the onset of skin lesions. [9] Herman medak et al (1970) stated that cytological examination of oral mucosal lesions is a simple diagnostic method of differentiating Pemphigus from other vesiculo bullous disorders of oral mucosa. [10] Philip.T.Valente et al (1999) demonstrated acantholytic cells from cervical smears in a patient of Pemphigus vulgaris. [11] See Table 4.

Graham et al in their study of 17 cases of Bullous impetigo stated that the cytology of Bullous impetigo with the inflammatory infiltrate and acantholytic cells excludes the diagnosis of other morphologically similar lesions like varicella. [13] See Table 5.

It is observed that the inflammatory infiltrate in the Bullous pemphigoid is mainly made up of eosinophils seen in one of the four cases. See Table 6.

Gupta et al (2005), Wiwok korkij et al (1984) in their study noted that the fluid in scabies showed a mixed infiltrate of polymorphs. The smear technique of cytodiagnosis is of distinctive value in making a rapid diagnosis of cutaneous neoplasm. [32] In the present study, the findings were similar to the above workers.

Table 5: Tzanck smear showing neutrophils in Bullous Impetigo in various studies.

Disease	Mete baba et al [14]	Anjum Farhana et al [2]	Our Study
Bullous Impetigo	92.00%	86.36%	80.00%

Table 6: Tzanck smear showing eosinophils in Bullous pemphigoid in various studies.

Disease	Anjum Farhana et al [2]	Shailaja Prabhala et al [3]	Our Study
Bullous pemphigoid	9.1%	6%	25%

Summary

Majority of the patients in this study belonged to Herpes group. Most of the patients belonged to above 40 years. Male preponderance was noted in the study. The lesions showed characteristic changes (multinucleate giant cells) in the epithelial cells which were diagnostic of viral vesicular infections. In cases of Molluscum contagiosum, the Tzanck smear showed Molluscum bodies. Patients on maintenance therapy with corticosteroids have shown fewer number of acantholytic cells compared with freshly diagnosed cases. In the present study, the number of acantholytic cells was proportional to the disease activity. In cases of Bullous impetigo, Tzanck smear showed marked polymorpho nuclear infiltrate in 80% of cases. In palmoplantar pustulosis, scabies, Dermatitis herpetiformis, Hidradenitis suppurativa predominantly polymorpho nuclear infiltrate was seen. The cytological studies in these conditions were of value in confirming the provisional clinical diagnosis of above conditions.

Conclusions

Careful analysis of various types of cases studied positively revealed that Tzanck smear is a safe, rapid bedside investigative aid in arriving at a provisional clinical diagnosis in the group of cutaneous viral disorders and immunobullous disorders like Pemphigus group and as an earliest diagnostic aid in various dermatosis. This study of 172 cases is perfectly in literary and scientific confirmation of the figures and facts already provided by a few other similar workers in the field of Dermatology in India. Although not a substitute for standard histology, in the hands of an experienced dermatologist Tzanck smears can aid in establishing the clinical diagnosis with ease and rapidity and can serve as an adjunct to routine histologic study. The technique is cheap, easy to perform and does not cause any discomfort to the patient.

Acknowledgement

We express our sincere thanks to our esteemed, retired Professor and HOD of the department of DVL, NRI Medical College and General Hospital, Dr. R. Subba Rao, M. D., for extending his full support and encouragement.

Conflicts of interest: None declared.

Funding source: Nil.

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