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DIAGNOSTIC UTILITY OF TZANCK SMEAR IN VESICULOBULLOUS LESIONS

Pathology

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ABSTRACT

Tzanck smear cytology is a rapid, inexpensive, and minimally invasive diagnostic method used in the evaluation of a broad spectrum of cutaneous lesions. This retrospective study, conducted at SMIMER Hospital and Medical College, Surat (January 2023–December 2024), assessed the diagnostic utility of Tzanck smears and their clinicopathological correlation. A total of 170 cases were evaluated. Cutaneous infections formed the largest group (48 cases; 28%), followed by immunobullous disorders (30 cases; 19.6%), acute inflammatory lesions (10 cases; 5.8%), candidiasis (9 cases; 5.4%),granulomatous lesions (2 cases; 1.1%), and leishmaniasis (1 case; 0.5%). Nonspecific lesions accounted for 70 cases (41.2%). Among immunobullous disorders, 30 pemphigus cases (17.6%) demonstrated numerous acantholytic cells, whereas 4 bullous pemphigoid cases (2%) showed prominent eosinophils. The findings highlight that Tzanck smear serves as a valuable first-line adjunctive diagnostic tool, particularly for vesiculobullous and infectious mucocutaneous lesions, while histopathology remains essential for definitive diagnosis.

KEYWORDS

Tzanck smear, cytology, vesiculobullous lesions, cutaneous infections.

INTRODUCTION

Cytology plays an important role in diagnosing diseases by examining morphological alterations in cells (Durdu, 2019). The Tzanck smear, introduced by Arnault Tzanck in 1947, has traditionally been applied to vesiculobullous disorders, particularly herpes infections (Durdu, 2019; Dey et al., 2015). Over time, its use has expanded to include a wide range of dermatological conditions such as granulomatous, inflammatory, infectious, and neoplastic lesions (Sabir et al., 2010; Eryilmaz et al., 2014; Kumar et al., 2018).

The technique is simple, cost-effective, and minimally invasive, making it especially useful in lesions where biopsy may be difficult, such as on the eyelids, lips, oral cavity, and genital areas. Despite these advantages, Tzanck smear remains a supplementary diagnostic tool and cannot substitute histopathology or immunofluorescence for definitive diagnosis.

MATERIALS METHODS & DURATION

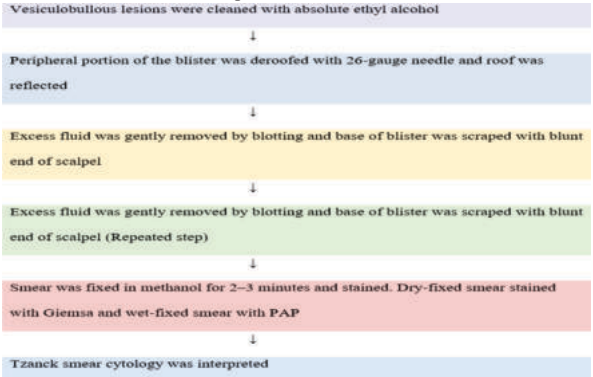
This retrospective study was conducted in the Cytopathology Section, Department of Pathology, in collaboration with the Department of Dermatology at SMIMER Hospital and Medical College, Surat, India, from January 2023 to December 2024.

Inclusion Criteria

- Clinically diagnosed vesiculobullous or ulcerative lesions.
- Lesions of recent onset (≤72 hours).

Exclusion Criteria

- Patients in remission or undergoing treatment for vesiculobullous disorders.
- Smears that were inadequate or inconclusive.



Preparation of Tzanck Smear – Flowchart

Data Analysis

Demographic details, lesion sites, and clinical diagnoses were recorded. All findings were compiled and analyzed descriptively.

RESULTS

Demographics

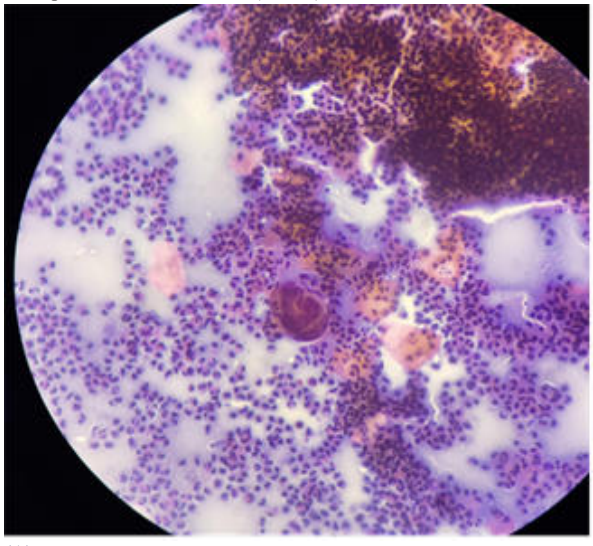
A total of 170 Tzanck smears were analyzed. The age range spanned from <10 to >40 years, with the highest clustering in the 20–39 years group. The male to female ratio was 2:1.

Distribution By Site

The genital region was the most common site (100 cases; 58.8%), followed by the anterior/posterior trunk (55 cases; 32.3%) and oral cavity (15 cases; 8.9%).

Cytological Categories

Herpes simplex/zoster: 48 cases (28.2%)
Pemphigus vulgaris: 26 cases (15.3%)
Bullous pemphigoid: 4 cases (2.4%)
Candidiasis: 9 cases (5.4%)
Leishmaniasis: 1 case (0.5%)
Acute inflammatory lesions: 10 cases (5.9%)
Granulomatous lesions: 2 cases (1.1%)
Nonspecific lesions: 70 cases (41.2%)



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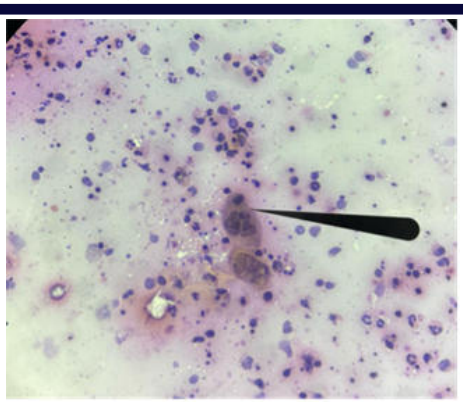

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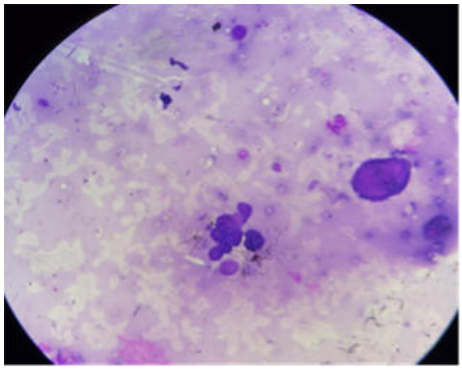


(C)

Figure 1: Multinucleated giant cells in *Herpes simplex/zoster* (Giemsa stain).
(A)-(10x)
(B)-(40x)
(C)-(40x)

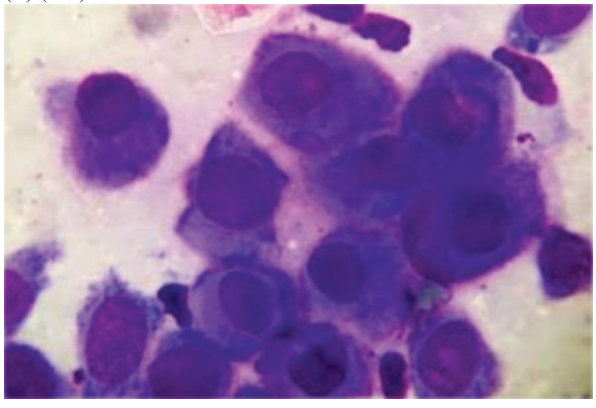
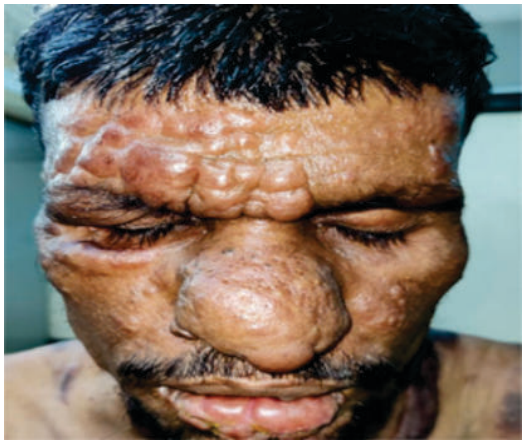


Figure 2: Acantholytic cell in *Pemphigus vulgaris* (Giemsa stain) (40x).



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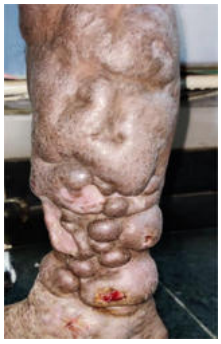

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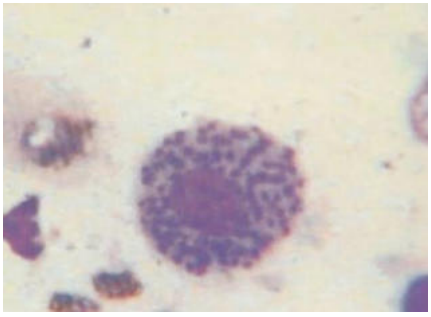

(C)

Figure 3: Gross and microscopic appearance in *Leishmania Donovani*.
(A) Ulcero-nodular lesion over the face.
(B) Ulcero-nodular lesion on the leg.
(C) Microscopic appearance (Giemsa stain).

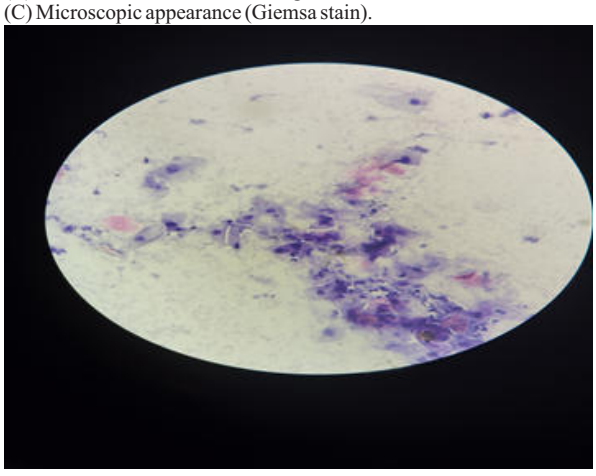

Figure 4: Candida under Giemsa stain showing yeast forms (40x).

Cytological Categories

Table A. Cytological Findings in Tzanck Smears

Cytological Diagnosis	Microscopy Findings
Herpes simplex/zoster	Multinucleated giant cells, ballooning degeneration
Pemphigus vulgaris	Acantholytic cells, hazy nucleoli
Bullous pemphigoid	No acantholysis, numerous eosinophils
Candidiasis	Yeast forms, pseudohyphae
Leishmaniasis	LD bodies in macrophages

Table B. Distribution Of Cases

Diagnosis	No. of Cases (170)	Percentage (%)
Herpes infection	48	28.2
Pemphigus vulgaris	26	15.3
Bullous pemphigoid	4	2.4
Candidiasis	9	5.4
Leishmaniasis	1	0.5
Acute inflammatory lesions	10	5.9
Granulomatous lesions	2	1.1
Non-specific lesions	70	41.2

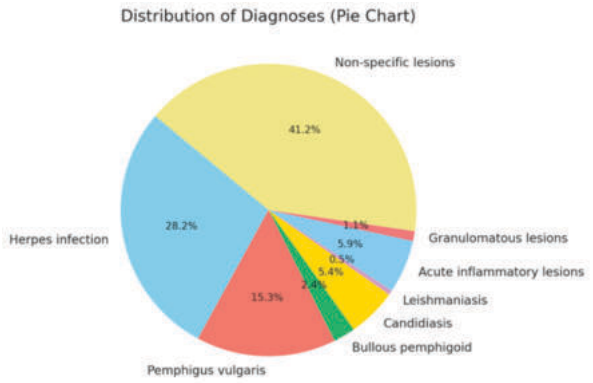

Figure 1. Distribution of diagnoses among the study participants.

This pie chart illustrates the proportional distribution of all diagnostic categories, including herpes infection, pemphigus vulgaris, bullous pemphigoid, candidiasis, leishmaniasis, acute inflammatory lesions, granulomatous lesions, and non-specific lesions.

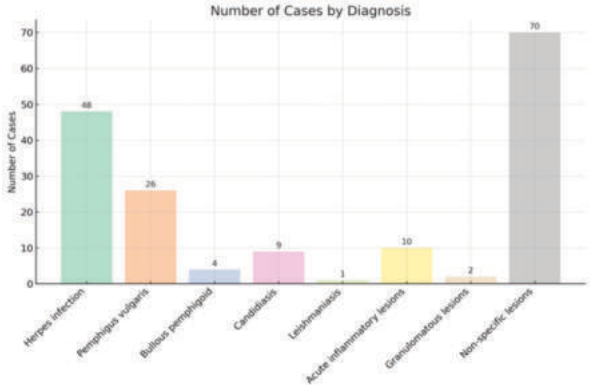

Figure 2. Number of cases recorded for each diagnosis.

This bar graph presents the absolute frequency of cases across all diagnostic categories, showing the highest number of cases in non-specific lesions and the lowest frequency in leishmaniasis.

Table C. Age-wise Distribution

Age Group (years)	No. of Patients
Below 10	6
10–19	11
20–39	56
40 & above	97

Table D. Clinical Distribution By Site

Site	No. of Cases	Percentage (%)
Genital area	100	58.8
Anterior/posterior trunk	55	32.3
Oral area	15	8.9

Table E. Comparison With Other Studies

Study	Year	Sample Size	Conditions Studied	Key Findings
Dey et al.	2013	100	Pemphigus vulgaris, bullous pemphigoid	Acantholytic and multinucleated giant cells
Khandpur et al.	2009	150	PV, PF, herpes zoster	Acantholytic cells, Tzanck cells, multinucleated giant cells
Present study	2023-2025	170	Herpetic, bullous, non-specific lesions	Acantholytic cells, multinucleated giant cells

Characteristic Microscopy Findings

Herpes cases revealed multinucleated giant cells with ballooning degeneration.

Pemphigus vulgaris showed numerous acantholytic cells with hazy nucleoli.

Bullous pemphigoid lacked acantholysis but demonstrated abundant leukocytes and eosinophils. Candidiasis showed yeast forms and pseudohyphae.

Comparison With Literature

The results correlate well with earlier studies by Dey et al. and Khandpur et al., confirming high diagnostic sensitivity for herpes and pemphigus, but limited utility in subepidermal blistering conditions.

DISCUSSION

Vesiculobullous lesions of the skin constitute a heterogeneous group of disorders. While most arise from primary dermatological conditions, they may also occur secondarily in a variety of unrelated diseases, often necessitating histopathological examination for definitive diagnosis. The Tzanck smear remains a valuable and widely utilized diagnostic tool, particularly in supporting the diagnosis of pemphigus group disorders and herpetic infections. Although viral infections are frequently diagnosed on clinical grounds, Tzanck smears can significantly enhance diagnostic accuracy.

Typical herpetic cytopathic changes include multinucleation, nuclear crowding, nuclear moulding, peripheral margination of chromatin, and the characteristic ground-glass appearance of nuclei. Intranuclear inclusions with a prominent halo, ballooning degeneration, and associated inflammatory cells may also be observed. In contrast, other bullous disorders such as bullous pemphigoid typically lack acantholytic cells and instead demonstrate a predominance of inflammatory infiltrates with numerous eosinophils.

Beyond vesiculobullous disorders, the Tzanck smear has broader diagnostic applications. It can aid in identifying various cutaneous infections such as molluscum contagiosum and leishmaniasis, as well as granulomatous dermatitis, genodermatoses including Hailey–Hailey disease, autoimmune conditions, and certain neoplasms like basal cell carcinoma and squamous cell carcinoma. Even some fungal infections, such as candidiasis and aspergillosis, can be recognized based on the distinct morphological features of their hyphae.

In our study, the majority of cases belonged to the herpes group. Most patients were above 40 years of age, and a male predominance was noted.

The primary limitations of the Tzanck smear include the possibility of obtaining non-representative samples, especially when slides are inadequately prepared from crusted vesicles or when the base of the lesion is not sufficiently scraped. These factors may compromise diagnostic reliability.

CONCLUSION

For the assessment of vesiculobullous, ulcerative, and infectious cutaneous lesions, Tzanck smear cytology is an easy, quick, and economical diagnostic method. It showed excellent diagnostic utility in this study, especially for pemphigus vulgaris and herpes infections. The Tzanck smear is a great first screening method that helps with early diagnosis and prompt clinical decision-making, even though it cannot take the place of histopathology or immunofluorescence. It is particularly useful in settings with limited resources and when quick bedside evaluation is needed because of its simplicity of use and low invasiveness.

Ethical Considerations

Conflict Of Interest: None declared.

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