DOI: 10.7860/JCDR/2022/51006.15891

Original Article

Dermatology Section

Role of Tzanck Smear Cytology in Dermatology: A Clinicopathological Study

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ABSTRACT

Introduction: Variety of lesions affecting the skin range from non specific dermatoses and inflammatory lesions to neoplastic changes in different components of the skin tissue. Tzanck smear is a simple, easy, rapid and inexpensive diagnostic technique which now being used for the diagnosis of erosive vesiculobullous lesions, tumours, granulomatous lesions and cutaneous infections.

Aim: To compare between the clinical diagnosis and Tzanck smear cytology diagnosis.

Materials and Methods: It was a cross-sectional study on Tzanck smears, conducted at a tertiary care referral Institute, PES Institute of Medical Sciences and Research (PESIMSR), Kuppam, Andhra Pradesh, India, from March 2016 to April 2017. In each case, Tzanck smear cytology diagnosis and clinical diagnosis was documented and compared with each other and with that of the available histopathological diagnosis. The clinicopathological concordance was calculated. All statistical calculations were done through Microsoft (MS) Excel 2007.

Results: Total of 50 cases of Tzanck smears were analysed. On Tzanck smear cytology, the common diagnostic entities included cutaneous infections and non specific inflammatory lesions each constituting 22 cases (44%). When compared with the Tzanck smear diagnosis, the diagnostic accuracy of clinical diagnosis was 60% on applying partial concordance criteria. When compared with the histopathological diagnosis, the diagnostic accuracy of clinical diagnosis and Tzanck smear cytology diagnosis were 66.67% and 83.33%, respectively on applying partial concordance criteria.

Conclusion: Tzanck smear is a prudent diagnostic tool for cytological evaluation of cutaneous lesion. It serves as a complimentary investigative modality to histopathology.

Keywords: Dermatoses, Diagnosis, Infections, Skin

INTRODUCTION

Cytology is a diagnostic tool which is based on investigating the morphological changes that occur in cells during the course of the diseases [1]. For dermatological diseases, cytology was first introduced by a French dermatologist Arnault Tzanck in 1947 for the purpose of diagnosis of vesiculobullous disorders, particularly herpes viral infection [1,2]. Various cutaneous lesions range from non specific dermatoses and inflammatory lesions to neoplastic changes in different components of the skin tissue [3]. Tzanck smear is a simple, easy, rapid and inexpensive diagnostic technique which is now being used for the diagnosis of other erosive vesiculobullous lesions, tumors, granulomatous lesions and cutaneous infections [4,5].

Many studies have been done which describes the cytomorphological features of various lesions [3-13]. Studies have been done on clinico-pathological concordance. But previous studies have not defined the criteria for concordance [3-6,9,12-15]. Hence, the present study was undertaken to compare between the clinical diagnosis and Tzanck smear cytology diagnosis, to compare between the clinical diagnosis and available histopathological diagnosis and to compare between the Tzanck smear cytology diagnosis and available histopathological diagnosis. The present study is novel in that it highlights the importance of method of analysing the data by employing concordance criteria.

MATERIALS AND METHODS

It was a cross-sectional study of clinicopathological concordance, conducted at the Cytopathology Section in the Department of Pathology in coordination with the Department of Dermatology at a rural tertiary care referral institute, PES Institute of Medical Sciences and Research (PESIMSR), Kuppam, Andhra Pradesh, India from March 2016 to April 2017. The study was approved by Institutional Ethics Committee (PESIMSR/IHEC/41).

Sample size calculation: The calculation was done on the basis of data from the previous study (Sabir F et al., [3] - p=48%, d=14%). The sample size was calculated using following formula:

$$n=\frac{Z^2_{(1-\alpha/2)}\times p\times(1-p)}{d^2}$$

"n" is the sample size

"$Z^2_{(1-\alpha/2)}$" is the level of significance at 5% that is 95% confidence interval

"p" is the expected proportion of cytology samples

"d" is the desired error of margin

The sample size was calculated as to be 50.

Inclusion criteria: All cases presenting with dermatological lesions requiring cytopathological evaluation were included in the study.

Exclusion criteria: Those cases in which the material obtained was inadequate for interpretation or the cytological diagnosis was inconclusive were excluded from the study.

In each case, Tzanck smears were prepared from the skin lesions according to the standard operating procedure. Routinely, Tzanck smears were air dried. Whenever possible, additional material was deposited onto another slide and wet fixed in isopropyl alcohol. All air dried smears were stained by May-Grünwald-Giemsa (MGG) stain using commercially available staining kit from a standard company. All wet fixed smears were stained by Papanicolaou method using commercially available staining kit from a standard company. The staining procedure was done according to the standard operating procedure (according to the kit insert provided by the manufacturer).

Available clinical details including particulars of the patient such as name, age, gender, site of involvement of the lesion and clinical diagnosis were collected. Tzanck smear cytology diagnosis and available histopathological diagnosis was documented.

The clinical diagnosis was compared with Tzanck smear cytology diagnosis and the concordance was calculated. The Tzanck smear cytology diagnosis was compared with available histopathology diagnosis and concordance was calculated. Similarly, clinical diagnosis was compared with available histopathology diagnosis and the concordance was calculated. Histopathological evaluation could be performed in only six cases. This is because in most of the instances, the treatment was given based on the cytological diagnosis.

Criteria for Clinical Diagnosis

Tzanck smear cytology diagnosis concordance, Tzanck smear cytology diagnosis-histopathology diagnosis concordance and Clinical diagnosis-histopathology diagnosis concordance was indigenously designed based on Sunila et al., [16].

Criteria for clinical diagnosis-Tzanck smear cytology diagnosis concordance:

- "Complete concordance" in clinical diagnosis was applied to the cases in which the clinical diagnosis was identical to the Tzanck smear diagnosis.
- "Partial concordance" in clinical diagnosis was applied to cases in which the clinical diagnosis showed minor deviation from Tzanck smear diagnosis but the lesion belonged to the same main category or one of the clinical differential diagnoses matched with Tzanck smear diagnosis.
- "Discordance" in clinical diagnosis was considered in cases where clinical diagnosis differed from the Tzanck smear diagnosis.

Criteria for Tzanck smear cytology diagnosis-Histopathology diagnosis concordance

- "Complete concordance" in Tzanck smear diagnosis was applied to the cases in which the Tzanck smear diagnosis was identical to the final histopathological diagnosis.
- "Partial concordance" was applied to cases in which the Tzanck smear diagnosis showed minor deviation from histopathological diagnosis but the lesion belonged to the same main category or one of the Tzanck smear differential diagnoses matched with final histopathological diagnosis.
- "Discordance" was considered in cases where Tzanck smear diagnosis differed from the histological diagnosis.

Criteria for clinical diagnosis-Histopathology diagnosis concordance

- "Complete concordance" in clinical diagnosis was applied to the cases in which the clinical diagnosis was identical to the final histopathological diagnosis.
- "Partial concordance" was applied to cases in which the clinical diagnosis showed minor deviation from histopathological diagnosis but the lesion belong to the same main category or one of the clinical differential diagnoses matched with final histopathological diagnosis.
- "Discordance" was considered in cases where clinical diagnosis differed from the final histopathological diagnosis.

STATISTICAL ANALYSIS

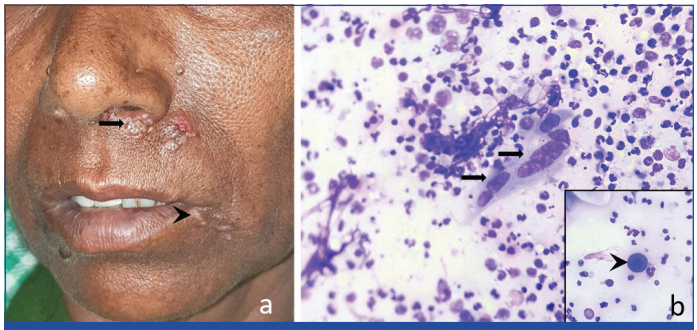
The socio-demographic variables were represented using frequencies and percentages. All statistical calculations were done through MS Excel software 2007.

RESULTS

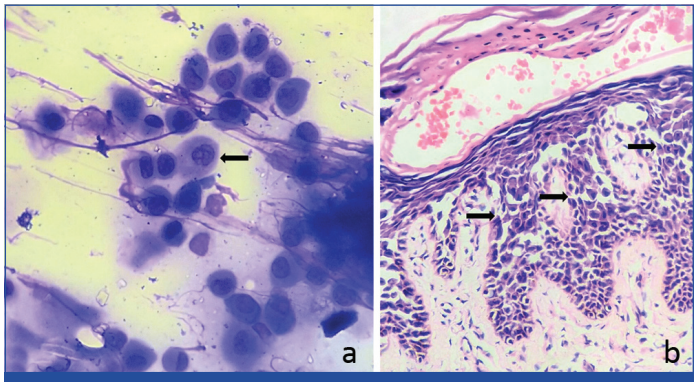
In the present study, 50 cases of Tzanck smears were analysed. The age ranged from one day old newborn to 70 years. Clustering of cases was seen in third decade (mean age=31.54 years). The lesions were seen predominantly in females {27 cases (54%)} with a M:F ratio of 0.85:1. Head and neck region, and upper extremities were the common site of involvement of lesions constituting 17 cases (34%) each, followed by chest and trunk constituting 5 cases (10%) each. Lower extremity and external genitals constituted 3 cases (6%) each.

Clinical diagnosis: Most common diagnostic entity was cutaneous infections {35 cases (70%)} [Table/Fig-1a], followed by immunobullous disorders [7 cases (14%)], non specific dermatitis {3 cases (6%)}, genodermatosis {2 cases (4%)}, chronic inflammatory lesion {1 case (2%)}, spongiotic dermatitis {1 case (2%)} and neoplastic lesion {1 case (2%)}.

Cytological diagnosis: Cutaneous infections [Table/Fig-1b] and non specific inflammatory lesions were the common cytological diagnostic entities constituting 22 cases (44%) each, followed by immunobullous lesions {4 cases (8%)}, genodermatosis {1 case (2%)} [Table/Fig-2a,b] and neoplastic lesion {1 case (2%)} [Table/Fig-3].



[Table/Fig-1]: Cutaneous infections: (a) Clinical photograph of herpes labialis: Multiple grouped vesicles near left nostril (arrow) and at angle of mouth (arrow head). (b) Tzanck smear cytology: Multinucleated giant cells displaying ground glass nuclei and nuclear moulding (arrows). Inset: Acantholytic cell (arrow head) (X400, MGG).



[Table/Fig-2]: Genodermatosis- Hailey-Hailey disease: (a) Tzanck smear cytology: Acantholytic cells arranged in cluster displaying noticeable nucleoli (arrow). {MGG, X400}. (b) Histopathology: Epidermis displaying acantholysis in the form of dilapidated brick wall appearance (arrows) (X100, H&E).

Histopathological diagnosis: Histopathological evaluation could be performed for only six cases. Most common histopathological diagnostic entity was immunobullous lesion {3 cases (50%)}, followed by non specific inflammatory lesion, chronic inflammatory lesion and genodermatosis [Table/Fig-2b], each constituting 1 case (16.67%) [Table/Fig-4].

Diagnostic accuracy of clinical diagnosis in comparison with Tzanck smear cytology diagnosis: Diagnostic accuracy of clinical diagnosis was 42% by complete concordance and increased to 60% on applying partial concordance criteria. On applying complete concordance criteria, genodermatosis and neoplastic lesions showed better concordance than immunobullous lesions and cutaneous infections. But non specific inflammatory lesions showed discordance. On applying partial correlation criteria, genodermatosis, neoplastic lesions and cutaneous infections showed better concordance than immunobullous lesions and non specific inflammatory lesion. The diagnostic accuracy improved for cutaneous infections and nonspecfic inflammatory lesions on applying the partial concordance criteria [Table/Fig-3].

Diagnostic accuracy of Tzanck smear cytology diagnosis in comparison with histopathological diagnosis: Diagnostic accuracy

Tzanck smear diagnoses	Cases n (%)	Clinical diagnoses		
		DACC-CT n (%)	DAPC-CT n (%)	Discordant-CT n (%)
Cutaneous infections	22 (44%)	16 (72.72%)	21 (95.45%)	1 (4.55%)
Herpes viral infections	13 (26%)	11 (84.62%)	12 (92.31%)	1 (7.69%)
Molluscum contagiosum	3 (6%)	3 (100%)	3 (100%)	0
Herpes viral infection with fungal infection	2 (4%)	0	2 (100%)	0
Fungal infection	2 (4%)	0	2 (100%)	0
Bullous impetigo	2 (4%)	2 (100%)	2 (100%)	0
Non specific inflammatory lesions	22 (44%)	0	4 (18.18%)	18 (81.82%)
Acute inflammatory lesions	12 (24%)	0	1 (8.33%)	11 (91.67%)
Acute on chronic inflammatory lesions	9 (18%)	0	2 (22.22%)	7 (77.78%)
Chronic inflammatory lesion	1 (2%)	0	1 (100%)	0
Immunobullous lesions	4 (8%)	3 (75%)	3 (75%)	1 (25%)
Pemphigus group (Pemphigus foliaceous)	2 (4%)	2 (100%)	2 (100%)	0
Staphylococcal scalded skin syndrome	1 (2%)	1 (100%)	1 (100%)	0
Bullous pemphigoid	1 (2%)	0	0	1 (100%)
Genodermatosis	1 (2%)	1 (100%)	1 (100%)	0
Hailey-Hailey disease	1 (2%)	1 (100%)	1 (100%)	0
Neoplastic lesion	1 (2%)	1 (100%)	1 (100%)	0
Basal cell carcinoma	1 (2%)	1 (100%)	1 (100%)	0
Total	50 (100%)	21 (42%)	30 (60%)	20 (40%)

[Table/Fig-3]: Diagnostic accuracy of clinical diagnoses in comparison with Tzanchk smear diagnoses.
DACC-CT: Diagnostic accuracy by complete concordance with respect to clinical diagnosis and tzanck smear diagnosis; DAPC-CT: Diagnostic accuracy after considering partial concordance with respect to clinical diagnosis and tzanchk smear diagnosis; Discordant-CT: Discordant cases with respect to clinical diagnosis and tzanchk smear diagnosis

Histopathological diagnoses	Cases n (%)	Tzanck smear diagnoses		
		DACC-TH n (%)	DAPC-TH n (%)	Discordant-TH n (%)
Immunobullous lesions	3 (50%)	2 (66.67%)	2 (66.67%)	1 (33.33%)
Pemphigus group (Pemphigus foliaceous)	1 (16.67%)	1 (100%)	1 (100%)	0
Bullous pemphigoid	2 (33.33%)	1 (50%)	1 (50%)	1 (50%)
Non specific inflammatory lesion	1 (16.67%)	0	1 (100%)	0
Acute on chronic inflammatory lesion	1 (16.67%)	0	1 (100%)	0
Chronic inflammatory lesion	1 (16.67%)	0	1 (100%)	0
Borderline tuberculoid leprosy	1 (16.67%)	0	1 (100%)	0
Genodermatosis	1 (16.67%)	1 (100%)	1 (100%)	0
Hailey-Hailey disease	1 (16.67%)	1 (100%)	1 (100%)	0
Total	6 (100%)	3 (50%)	5 (83.33%)	1 (16.67%)
Histopathology diagnoses	**Cases n (%)**	**Clinical diagnoses**		
		DACC-CH n (%)	**DAPC-CH n (%)**	**Discordant-CH n (%)**
Immunobullous lesions	3 (50%)	2 (66.67%)	2 (66.67%)	1 (33.33%)
Pemphigus group (Pemphigus foliaceous)	1 (16.67%)	1 (100%)	1 (100%)	0
Bullous pemphigoid	2 (33.33%)	1 (50%)	1 (50%)	1 (50%)
Non specific inflammatory lesion	1 (16.67%)	0	0	1 (100%)
Acute on chronic inflammatory lesion	1 (16.67%)	0	0	1 (100%)
Chronic inflammatory lesion	1 (16.67%)	1 (100%)	1 (100%)	0
Borderline tuberculoid leprosy	1 (16.67%)	1 (100%)	1 (100%)	0
Genodermatosis	1 (16.67%)	1 (100%)	1 (100%)	0
Hailey-Hailey disease	1 (16.67%)	1 (100%)	1 (100%)	0
Total	6 (100%)	4 (66.67%)	4 (66.67%)	2 (33.33%)

[Table/Fig-4]: Diagnostic accuracy of Tzanchk smear diagnoses and clinical diagnoses in comparison with histopathological diagnosis.
DACC-TH: Diagnostic accuracy by complete concordance with respect to tzanchk smear diagnosis and histopathological diagnosis; DAPC-TH: Diagnostic accuracy after considering partial concordance with respect to tzanchk smear diagnosis and histopathological diagnosis; Discordant-TH: Discordant cases with respect to tzanchk smear diagnosis and histopathological diagnosis; DACC-CH: Diagnostic Accuracy by Complete Concordance with respect to clinical diagnosis and histopathological diagnosis; DAPC-CH: Diagnostic accuracy after considering partial concordance with respect to clinical diagnosis and histopathological diagnosis; Discordant-CH: Discordant cases with respect to clinical diagnosis and histopathological diagnosis

of Tzanck smear diagnosis was 50% by complete concordance and increased to 83.33% on applying partial concordance criteria. On applying complete concordance criteria, genodermatosis showed better concordance than immunobullous lesions. But, non specific inflammatory lesion and chronic inflammatory lesion showed discordance. On applying partial concordance criteria, genodermatosis, non specific inflammatory lesion and chronic inflammatory lesion showed better concordance than immunobullous lesions. The diagnostic accuracy improved for non specific inflammatory lesion and chronic inflammatory lesion on applying the partial concordance criteria. On applying partial concordance criteria, the diagnostic accuracy of Tzanck smear cytology was better than clinical diagnosis [Table/Fig-4].

Diagnostic accuracy of clinical diagnosis in comparison with histopathological diagnosis: Diagnostic accuracy of clinical diagnosis was 66.67% by both complete concordance and partial concordance. Genodermatosis and chronic inflammatory lesion showed better concordance than immunobullous lesions. Non specific inflammatory lesion showed discordance [Table/Fig-4].

DISCUSSION

Skin is the organ in human body having maximum surface area and harbours for a variety of lesions [6]. Skin can be easily subjected to exfoliative cytology [5]. Cytopathology of the skin has been reported to be beneficial in the diagnosis of various skin lesions [3]. Tzanck smear cytology helps to establish early diagnosis and serves as a useful adjunct to routine histopathology [6]. The present study emphasises the clinicopathological correlation between clinical diagnosis and Tzanck smear cytology diagnosis.

The total number of cases analysed was highest in a study conducted by Lakshminarayana B et al., [12]. In contrast to the other studies, Patel M and Modi T and the present study had less number of cases [6]. In the present study, clustering of cases was seen in the third decade with a mean of 31.54 years. In contrast, Govindaraj T et al., and Khadse V et al., observed that the lesions were common in fourth decade in their study [7,14]. Majority of the patients were in the age group of 15-40 years in the study conducted by Patel M and Modi T [6]. Chintapalli S et al., documented most of the cases in the age group of ≥40 years [8]. Eryilmaz A et al., recorded a mean age of 39 years in their study [4]. Majority of cases were in seventh decade with a mean of 46.6 years in the study conducted by Singhal S and Hemalatha M [13]. Aneesh S et al., documented maximum number of cases in in the age group of 30-60 years with a mean of 44.7 years in their study [15]. Various studies showed variation in the age distribution of the cutaneous lesions. This could be due to variation in the distribution of the cutaneous lesions in the study population. Eryilmaz A et al., Khadse V et al., Aneesh S et al., and the present study documented cutaneous lesions predominantly in males [4,14,15]. In contrast, Patel M and Modi T, Govindaraj T et al., Chintapalli S et al., and, Singhal S and Hemalatha M documented cutaneous lesions predominantly in females in their studies [6-8,13]. Patel M and Modi T and the present study observed that head and

neck was the predominant site of involvement of cutaneous lesions [6]. Singhal S and Hemalatha M documented lesions all over the body, followed by extremities as the commonest site in their study [13]. However, the other studies had not specified about the site of involvement of the lesions. Eryilmaz A et al., and Govindaraj T et al., used MGG stain to stain the Tzanck smears in their studies [4,7]. Kumar AKKT et al., and Patel M and Modi T employed Leishman stain in their study [5,6]. Chintapalli S et al., Heera KP et al., and Aneesh S et al., used Giemsa stain in their study [8,9,15]. In the study conducted by Khadse V and the present study, MGG stain was used to stain air dried smears routinely and Papanicolaou stain was employed to stain alcohol fixed smears [14]. Similarly, Singhal S et al., also employed MGG stain to stain air dried smears. H&E and PAP were used to stain the alcohol fixed smears in their study [13].

Eryilmaz A et al., Patel M and Modi T, Lakshminarayana B., and, Singhal S and Hemalatha M documented cutaneous infections as most common cytological diagnosis in their studies [4,6,12,13]. In contrast, Kumar AKKT et al., documented non specific conditions, Govindaraj T et al., documented neoplastic lesions and, Singhal S and Hemalatha M documented immunobullous lesions as the most common cytological diagnosis in their study [5,7,13]. In the present study, cutaneous infections and non specific inflammatory lesions were found to be the common cytological diagnostic entities [Table/Fig-5] [4-7,12-14].

In the present study, clinical diagnosis was correlated with cytological diagnosis and available histopathology diagnosis. Cytology diagnosis was also correlated with available histopathology diagnosis. When clinical diagnosis was compared with Tzanck smear diagnosis (Tzanck smear clinical concordance), the present study showed lower concordance than Kumar AKKT et al., Patel M and Modi T and, Singhal S and Hemalatha M [5,6,13]. The lower concordance may be attributed to clinical mimickers of the cutaneous lesions and non representative samples. When Tzanck smear diagnosis was compared with histopathology diagnosis (Tzanck smear-histopathology concordance), the present study showed lower concordance than Patel M and Modi T, Govindaraj T et al., Lakshimanaraya B et al., and Khadse V et al., [6,7,12,14]. The lower concordance can be attributed to less number of cases being subjected to histopathological evaluation. However, the concordance was higher than Kumar AKKT et al., and, Singhal S and Hemalatha M [Table/Fig-6] [5-7,12-14].

Tzanck smear may be helpful to solve clinical dilemma in many instances. The clinical diagnosis of herpes viral infection is usually straight forward. But in some instances it can pose diagnostic dilemma. Tzanck smear may be helpful to differentiate between clinical mimickers like herpetic gingivostomatitis (versus recurrent aphous ulcer), Kaposi varicelliform eruption (versus impetigenised atopic dermatitis), genital herpes (versus other venereal diseases or genital aphthous ulcer, puacilesional or atypical forms with non dermatomal distribution (versus bacterial folliculitis) [10,11]. The presence of pathognomonic multinucleated keratinocytes confirms the diagnosis of herpes viral infection. Tzanck smear may be useful to differentiate between molluscum contagiosum and closed comidones or epidermoid microcyts (milia) [10]. The presence of molluscum bodies (Handerson Patterson bodies) confirms the diagnosis [8]. In fact, Tzanck smear is more advantageous than the conventional histopathology in the diagnosis of early stages of leishmaniasis. Tzanck smear may be helpful to distinguish between Hailey-Hailey disease and its clinical mimickers like candida intertrigo, tinea inguinalis, inverse psoriasis and intertriginous dermatoses [10]. The findings in bullous pemphigoid are non specific [5]. Bullous pemphigoid may simulate pemphigus vulgaris when the blistering does not occur on an erythematous base [10]. Tzanck smear may be employed to differentiate between bullous pemphigoid and pemphigus group of disorders [5]. The absence of acantholytic cells, scarcity of keratinocytes and abundance of leukocytes displaying the phenomenon of leukocyte adherence supports the diagnosis of bullous pemphigoid. Senile sebaceous hyperplasia and sebaceous adenoma may clinically mimic incipent and full blown basal cell carcinoma respectively. Tzanck smear helps to establish the correct diagnosis. Paget disease of the breast and extramammary region may deceitfully mimic banal conditions such as chronic eczema, psoriasis or intertrigo. Tzanck smear cytology may prove to be valuable to solve the diagnostic dilemma. The presence of paget cell displaying enlarged, microvacuolated, polychromatophilic cytoplasm and large, round to oval, nucleolated nucleus favors the diagnosis of paget disease. The differential diagnoses of erythroplasia of Queyrat include candidiasis, psoriasis, lichen planus, fixed drug eruption and plasma cell balantis of Zoon. The presence of epithelial cells displaying features of poikilokaryosis such as nuclear polymorphism [10].

Authors	N	Cutaneous infections	Granulomatous inflammatoin	Non specific inflammation	Immuno-bullous lesion	Tumors	Spongiotic dermatitis	Genodermatosis	Other conditions
Eryilmaz A et al., [4] (Turkey, 2014)	500	193 (38.6%)	38 (7.6%)	0 (0%)	11 (2.2%)	190 (38%)	54 (10.8%)	5 (1%)	9 (1.8%)
Govindaraj T et al., [7] (India, 2017)	55	21 (38.18%)	0 (0%)	0 (0%)	0 (0%)	27 (49.09%)	0 (0%)	0 (0%)	7 (12.73%)
Kumar AKKT et al., [5] (India, 2018)	70	11 (15.71%)	0 (0%)	0 (0%)	22 (31.43%)	0 (0%)	0 (0%)	0 (0%)	37 (52.86%)
Lakshminarayana B et al., [12] (India, 2018)	565	272 (48.14%)	0 (0%)	0 (0%)	193 (34.16%)	0 (0%)	0 (0%)	14 (2.48%)	0 (0%)
Khadse V et al., [14] (India, 2018)	102	36 (35.29%)	0 (0%)	18 (17.65%)	45 (44.12%)	0 (0%)	1 (0.98%)	0 (0%)	2 (0.98%)
Patel M et al., [6] (India, 2020)	50	24 (48%)	0 (0%)	0 (0%)	17 (34%)	3 (6%)	0 (0%)	0 (0%)	6 (12%)
Singhal S et al., [13] (India, 2020)	62	26 (41.94%)	0 (0%)	0 (0%)	23 (37.10%)	0 (0%)	0 (0%)	0 (0%)	13 (20.97%)
Present study (India, 2022)	50	22 (44%)	0 (0%)	22(44%)	4 (8%)	1 (2%)	0 (0%)	1 (2%)	0 (0%)

[Table/Fig-5]: Comparison of pattern of distribution of cytological diagnosis on Tzanck smear in various studies [4-7,12-14].

Authors	Tzanck smear-Clinical concordance	Tzanck smear-Histopathology concordance
Govindaraj T et al., [7] (India, 2017)	-	89.09%
Kumar AKKT et al., [5] (India, 2018)	61.11%	68.42%
Lakshminarayana B et al., [12] (India, 2018)	-	92.7%
Khadse V et al., [14] (India, 2018)	-	100%
Patel M et al., [6] (India, 2020)	88%	100%
Singhal S et al., [13] (India, 2020)	77.4%	64.86%
Present study (India, 2022)	60%	83.33%

[Table/Fig-6]: Comparison of concordance of Tzanck smear cytology in various studies [5-7,12-14].

The Tzanck smear procedure is a simple, reliable, rapid, cost-effective and non invasive investigation [4]. The procedure is usually well tolerated. It can be performed or even repeated even in timorous patients such as children. It can be done at sites which are difficult to be biopsied such as eyelid, lips, oral cavity, genitals and face which poses aesthetic problems. Nevertheless, Tzanck smear cytology cannot be considered as a substitute for histopathology. Histopathological evaluation is needed to establish confirmatory diagnosis [10].

Tzanck smear may help to rule out clinical mimickers and establish the correct diagnosis. It may be suggested that better concordance can be achieved by providing differential diagnoses of clinical mimickers in future studies. Smears taken from the fresh lesions

and from the representation areas may minimise the discordance rate and thereby improve the concordance.

Limitation(s)

The number of cases were relatively less in comparison with other studies. Histopathological evaluation could be performed in only six cases. This is because in most of the instances, the treatment was instituted based on the cytological diagnosis.

CONCLUSION(S)

Tzanck smear is a prudent diagnostic tool for cytological evaluation of cutaneous lesion. It serves as a complimentary investigative modality to histopathology. It may be suggested that a better concordance can be achieved by providing differential diagnoses of clinical mimickers in future studies. Smears taken from the fresh lesions and from the representation areas may minimise the discordance rate and thereby improve the concordance.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Jun 23, 2021
- Manual Googling: Oct 20, 2021
- iThenticate Software: Dec 16, 2021 (16%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. No

Date of Submission: **Jun 22, 2021**
Date of Peer Review: **Jul 29, 2021**
Date of Acceptance: **Nov 18, 2021**
Date of Publishing: **Jan 01, 2022**