

## Diagnostic efficacy of evoked scale sign compared with Potassium hydroxide (KOH) wet mount for diagnosis of Pityriasis Versicolor (PV) cases

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### ABSTRACT

Pityriasis Versicolor (PV) is a superficial cutaneous mycosis prevalent in tropical and subtropical countries, caused by overgrowth of yeast of genus *Malassezia*, lipophilic yeast present in normal skin. Evoked scale sign is an important clinical sign useful in diagnosing pityriasis versicolor. Aim of the study is to compare the effectiveness of evoked scale sign in pityriasis versicolor cases compared with Potassium hydroxide (KOH) wet mount. To demonstrate the diagnostic efficacy of evoked scale sign in comparison with KOH wet mount for diagnosis of PV. A total number of 450 different body sites of 422 pityriasis versicolor cases with respect to color of lesions were studied. Evoked scale sign examination was done by stretching lesion using fingers and 10% KOH wet mount was performed with skin scrapings. Statistical analysis was done. Out of 450 lesions sampled, Wood's lamp was positive with 414 (92%). KOH wet mount gave 402 (89.3%) positive results. The sensitivity and specificity of Evoked scale sign when compared with KOH wet mount as gold standard is 100% and 75% respectively. The diagnostic efficacy of evoked scale sign is comparable to KOH wet mount. This is a non-invasive, simple method, very useful in occasions where there is no facility for more definitive testing.

### KEY WORDS

Pityriasis versicolor (PV), *Malassezia*, Potassium hydroxide (KOH) wet mount, Evoked scale sign

### Introduction

Pityriasis versicolor is a disease process that occurs when the yeast of the genus, *Malassezia* (a part of normal skin flora), changes to its hyphal form causing pigmentary changes in the skin (McNally B2010). Enzyme keratinase causes loosening of stratum corneum resulting in scale formation (Han A 2009, Nevas J 2012). Disease is characterized by asymptomatic hyperpigmented lesions in the skin covered by fine furfuraceous scales (Kangle S 2006).

Dermatologic diagnosis relies on careful observation and documentation of signs, and most of signs appear either de novo or have to be elicited by the physician (Madke B 2012). A clinical sign helpful for diagnosis of PV is evoked scale sign otherwise known as Zileri's sign, Besnier's sign or scratch sign coup d'ongle sign (Han A 2009, Levin NA 2011, Fitzpatrick TB 1993). This can be elicited in patients having pityriasis versicolor, either by stretching or scraping the affected skin (Han A 2009). In the stretching technique, the clinician uses thumb and forefinger to stretch, eliciting a visible white patch of scale overlying the affected lesion. Scraping method is done by scraping the active lesion with a sharp blade or glass slide may reveal a powder or scale. (McNally B2010, Han A 2009, Haisley-Royster C2011). Wood's lamp, on exposure to UV light may also help to demonstrate the yellow orange to green yellow fluorescence of PV due to the production of ptyriolactone (Gupta AK 2004, Remya VS 2019). However, gold standard for diagnosis is KOH wet mount, which reveals a "spaghetti and meatball" appearance (McNally B2010, Nevas J 2012, Mayser P and Reiche 2009).

Diagnostic tests are prone to errors i.e.; in some cases diagnosis are missed when test results are negative. Positive test result in the absence of disease may also occur (Van Stralen KJ 2009). The present study was done to compare the diagnostic efficacy of evoked scale sign in comparison with KOH wet mount for diagnosis of PV by estimating sensitivity and specificity.

### Materials and methods

This study was conducted at a tertiary care hospital in North Kerala. The study group comprises of 422 clinically suspected cases of PV attending Dermatology Outpatient Department over a period of one year. A total number of 450 different body sites of 422 PV cases with respect to colour of the lesions were studied. After taking informed consent, evoked scale sign examination and KOH wet mount was performed.

#### Evoked scale sign

Infected area of the skin of all suspected cases was stretched with the thumb and forefinger and observed for the production of visible white patch of scales overlying the affected area; on release the scaly patch on the affected area is still recognizable. The results were recorded (Assaf RR and Weil 1996)

**Direct microscopy:** Microscopic examination of the skin scrapings was performed with 10% KOH wet mount for detection of fungal elements. (Spaghetti and meatball appearance). Scales collected from lesions by scraping with sterile No: 15 scalpel blade were placed on a clean glass slide with 10% KOH. A cover slip was placed and the preparation was examined under the 40X objective of microscope (Larone DH 1995). Results obtained were tabulated and statistical evaluation was done.

## Results

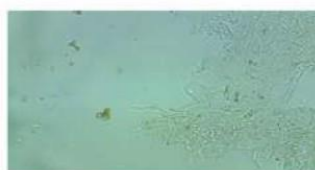
This study compared two different methods for diagnosis of PV. Since KOH wet mount is the commonly used existing method for identifying PV, KOH wet mount has been considered as the gold standard and evoked scale sign is compared to this. Out of 450 lesions studied, evoked scale sign was positive with 414 (92%) of cases studied KOH wet mount gave 402 (89.3%) positive results. Negative result was got in 36 (8 %) with evoked scale sign and 48 (10.67%) with KOH wet mount. (Table-I)

**Table-I. Diagnostic efficacy of evoked scale sign compared with KOH wet mount in PV cases.**

| Pityriasis versicolor cases |          | KOH wet mount |          | Total |
|-----------------------------|----------|---------------|----------|-------|
|                             |          | Positive      | Negative |       |
| Evoked scale sign           | Positive | 402           | 12       | 414   |
|                             | Negative | 0             | 36       | 36    |
| Total                       |          | 402           | 48       | 450   |

All cases which were found to be positive using 10% KOH wet mount (figure-1) were also diagnosed as positive using evoked scale sign (figure-2). Additional of 12 cases were found to be positive using evoked scale sign. A total of 48 cases were found to be negative using KOH of which 36 were also found to be same using evoked scale sign. Sensitivity of evoked scale sign compared to KOH as gold standard is 100% and the specificity is 75%.

**Figure 1. 10% KOH wet**



**Figure 2. Evoked scale**



## DISCUSSION

Pityriasis versicolor (formerly tinea versicolor) is a chronic fungal infection caused by yeasts of genus *Malassezia*, (Crespo Erchiga V 2005, Gaitanis G 2013, Abdullah AM, 2012) which can be easily diagnosed by clinical presentation (hyperpigmented or hypopigmented, finely scaling macules or patches). Being lipid dependent, they are commonly seen in areas rich in sebaceous glands such as chest, back, neck and shoulders (Rooks 2004, Gupta AK 2002, Clinical Dermatology 2004). Diagnosis is confirmed by using 10% KOH wet mount, which demonstrates "spaghetti and meatballs" pattern (McNally B2010, Nevas J2012, Remya VS 2019). The Wood's lamp is also helpful by demonstrating characteristic fluorescence (Gupta AK 2002, Haisley-Royster C2011)

Elicitation of signs enhances clinical acumen of dermatologists (Madke B 2012). One of such clinical signs associated with diagnosis of PV is evoked scale sign (Han A 2009, Levin NA 2011) which is to be elicited either by stretching or scraping the affected skin. Scale formations after scratching the lesion may be seen in the early stages of Pityriasis rosea as well as in Pityriasis versicolor and psoriasis.

Scratching scale in psoriasis vulgaris makes the scale appear more silvery white due to the reflection of light at the air-keratin interface between the layers of scale. Large heaped-up scale accumulation in psoriasis is described as oyster-like scale. In *Ichthyosis vulgaris*, ichthyosiform scale-large, polygonal scales - as in fish scales are seen. The firmly adherent, dry, rough and often yellow or brown coloured scales have a gritty feel like sandpaper are seen in actinic keratosis, where the scales are better appreciated by skin palpation. In acute stage of erythroderma scales, can be large plate-like sheets, whereas fine and bran-like in chronic stage.

Fine and loose scales that are not conspicuous, made visible by scratching are characteristics of pityriasis versicolor (Kangle S 2006). This can be explained by the production of enzyme keratinase resulting in formation of loosened disoriented cells in the upper two thirds of the stratum corneum where the fungi reside (Fitzpatrick TB 1993, Assaf RR 1996).

This study revealed evoked scale sign positivity of 92% which is in well agreement with the studies done in West Bengal (Banarjee S 2011) with 91.3% and in Erbil city2 (Abdulla AM 2013) with 93.3%. This is in contrast with the studies done in Brazil (Santana JO 2013) in which only 65.7% cases are positive.

Sensitivity of evoked scale sign compared to KOH as gold standard is 100%. So, this test will be able to detect all cases of PV. The specificity of the test was 75% means that there are few false positive results. No studies are available regarding the diagnostic efficacy of evoked scale sign compared to KOH wet mount. Evoked scale sign is not a confirmatory test for PV (Lookingbill DP 1992). One has to bear in mind that signs are not specific and can be observed in other related or unrelated disorders (Kangle S 2006).

## Conclusion

The diagnostic efficacy of evoked scale sign is comparable to KOH wet mount. Evoked scale sign provide a rapid result and can be used as a non-invasive, inexpensive simple method for diagnosis of PV. It is not a confirmatory test ;but can be very helpful in circumstances where there is no facility for more definitive testing. We recommend this technique be performed in association with Wood's lamp examination and should always be confirmed by laboratory diagnosis for better results.

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