

Circulating and Cutaneous Expression of Caveolin-1 in Common Wart

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Abstract

Background: The marker is the major component, is a specific marker of caveolae, and is generally distributed in smooth muscle cells, endothelial cells, skeletal myoblasts, fibroblasts and adipocytes. It modulates a wide range of cellular events such as proliferation, lipid metabolism, cellular tracking and signal transduction. Matrix metalloproteinase-1 (MMP-1) protein levels were negative or low in dysplastic warts. Serum and tissue level of marker enhances cell surface plasminogen activation and regulation of MMP-1. **Objectives:** The aim of this study was to evaluate the serum and tissue level of marker in patients with common warts and compare their levels with healthy controls. **Method:** The present study included 30 patients with common warts. In addition to 10 age and sex matched apparently healthy controls were included in the study. Any subject was presented with any of the following conditions was excluded from the study; patient less than 15 years old and above 35 years, patient taking topical medication, patient with hypertension or diabetes and patient with any systemic diseases. All subjects were evaluated for serum and tissue level of marker by enzyme-linked immunosorbent assay (ELISA). **Results:** No significant differences were found between studied groups regarding occupations. Hand was the most affected site (56.7%), followed by leg and thigh. Most of cases (76.7%) were affected by multiple lesions. Mean size was 6.2 mm. **Conclusion:** From the results of present study, it is concluded that there were no significant differences were found between studied groups regarding occupations. Hand was the most affected site (56.7%), followed by leg and thigh. Most of cases were affected by multiple lesions. Mean size was 6.2 mm.

Key words: Common warts, Dendritic cells, Human papilloma virus, Matrix metalloproteinase-1, Serum and tissue level of marker.

1. Introduction

Warts (verruca) are common skin infections caused by human papilloma virus (HPV), the clinical appearance of warts is variable and depends to some extent on the type of HPV involved and the site of infection, the main types of warts include common warts, plantar warts, mosaic warts, filiform warts, flat warts and genital warts [1].

Common warts are hyperkeratotic, exophytic, dome shaped papules or plaques that are typically associated with HPV-1, 2, 4, 27 or 57. They are most frequently located on the fingers and dorsal surfaces of the hands or in other sites prone to trauma such as the knees or elbows [2].

The cutaneous warts among school children in Egypt and worldwide are with a prevalence varying from 2.4% to 33% with an equal frequency in both sexes [3]. The risk factors to increase the risk of common warts among children and adolescents. Of these factors, low social class, big family size, and rearing household animals were reported [4].

Human papilloma virus is a viral infection that's passed between people through skin-to-skin contact. Human papilloma viruses are small deoxyribonucleic acid (DNA) viruses of the papova virus family. More than 120 different types of HPVs have been described. Based on sequence relatedness, the HPV phylogenetic tree is composed of five genera (α , β , γ , μ , and ν papillomaviruses) [5].

The marker, an integral membrane protein, is the principal component of caveolae in membranes and is involved in multiple cellular functions such as endocytosis, cholesterol homeostasis and signal

transduction. The marker is critical for insulin receptor-mediated signaling, insulin secretion, and potentially the development of insulin resistance [6].

As serum and tissue marker expression is reduced in hyperproliferative skin disorder as psoriasis [7], and the main pathogenesis of wart is keratinocyte hyperproliferation as HPV infects epithelial cells result in proliferation of cells with formation of the typical warty papule or plaque [8].

This study aimed to evaluate the serum and tissue level of marker in patients with common warts and compare their levels with healthy controls.

2. Subjects and Methods

2.1. The study population:

This was a case control study. Patients were included in this study were from outpatient clinic of Dermatology, Venereology and Andrology Department of Benha University Hospitals in the period between September 2020 and April 2021 after the approval by Research Committee at Faculty of Medicine, Benha University. This study included 30 patients with common warts. In addition to 10 age and sex matched apparently healthy controls were included in the study. Every subject was informed about the aim of the study and an informed consent was obtained from each individual before sample collection. Any subject was presented with any of the following conditions was excluded from the study; patient less than 15 years old and above 35 years, patient taking topical medication, patient with hypertension or diabetes and patient with any systemic diseases. Patients were subjected to full history-taking and whole body was inspected in good

day light for; the number of the common warts, site and number of lesions in hand, knee and elbow. All patients were evaluated for serum and tissue marker levels by ELISA kits.

2.2. Samples collection and storage:

3ml of whole venous blood was withdrawn under complete aseptic conditions, the blood was put in plain tube then left at room temperature for about 20 minutes till the blood coagulated then the blood was centrifuged at speed of 3000 rpm for 20 minutes and the serum was separated and stored at -40° C till analyzed.

Punch biopsy was taken by circular scalpel (4mm) turned clockwise and counterclockwise from patient and corresponding sites from control group. These skin biopsies were homogenized in 1.5 ml extraction buffer per gram of tissue using a glass homogenizer. The homogenates were transferred to 1.5 ml Eppendorf tubes, centrifuged at 3000 rpm for 20 minutes at 4°C. The supernatant stored at -40 c until analysis of serum and tissue marker level.

2.3. Statistical Analysis

The collected data was revised, coded, tabulated and introduced to a PC using Statistical package for Social

Science (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Data were presented and suitable analysis was done according to the type of data obtained for each parameter. Student T Test was used to assess the statistical significance of the difference between two study group means. Mann Whitney Test (U test) was used to assess the statistical significance of the difference of a non-parametric variable between two study groups. The Kruskal-Wallis test is was used to assess the statistical significance of the difference between more than two study group non parametric variables. Chi-Square test was used to examine the relationship between two qualitative variables. Fisher's exact test: was used to examine the relationship between two qualitative variables when the expected count is less than 5 in more than 20% of cells. Correlation analysis: To assess the strength of association between two quantitative variables. The correlation coefficient defines the strength and direction of the linear relationship between two variables. A *p* value is considered significant if <0.05 at confidence interval 95%.

3. Results

No significant differences were found between studied groups regarding occupations **Table (1)**.

Table (1) Comparison of occupation among studied groups.

	Control (n=10)		Patient (n=30)		test (X ²)	p
	N	%	N	%		
House Wife	2	20%	10	33.3%	0.635	0.426
Healthcare worker	3	30%	3	10%	2.353	0.125
Student	2	20%	8	26.7%	0.178	0.673
Worker	1	10%	6	20.0%	0.519	0.472
Employee	1	10%	2	6.7%	0.120	0.729
Engineer	1	10%	0	0%	0.721	0.279
Soldier	0	0%	1	3.3%	0.441	0.559

Chi square (X²) test were used for categorical parameters.

Hand was the most affected site (56.7%), followed by leg and thigh. Most of cases were affected by multiple lesions. Mean size was 6.2 mm **Table (2)**.

Table (2) Clinical features of studied cases.

		Patient (n=30)	
Age of onset (years)		mean±SD	25.1 ±5.7
Disease duration (months)		Median (range)	7 2-48
Course	Intermittent	N, %	7 23.3%
	Progressive	N, %	23 76.7%
Sites	Head	N, %	17 56.7%
	Face	N, %	3 10.0%
	Scalp	N, %	2 6.7%
	Arm	N, %	2 6.7%
	leg and thigh	N, %	4 13.3%
	Foot	N, %	2 6.7%
Number	Single	N, %	7 23.3%
	Multiple	N, %	23 76.7%
Size (mm)		mean±SD	6.2±2

4. Discussion

Warts are small, rough, and hard growths that are similar in color to the rest of the skin [9]. Warts are usually asymptomatic except when present on the bottom of the feet where they may be painful [10]. Warts are benign proliferations seen in skin and mucosa due to infection with HPV [11].

Human papilloma viruses are small nonenveloped double-stranded DNA viruses of the papova virus family and with over 200 types identified [12]. All HPV types are epitheliotropic, infect squamous epithelia (skin and mucosae). Its infection is widespread, annually, 14 million persons are infected and 79 million persons have a ubiquitous infection [13].

The marker is the major component, is a specific marker of caveolae, and is generally distributed in smooth muscle cells, endothelial cells, skeletal myoblasts, fibroblasts and adipocytes [14]. The marker modulates a wide range of cellular events such as proliferation, lipid metabolism, cellular tracking and signal transduction [15].

Epidermal growth factor receptor has been activated in cells infected with HPV, suggesting that it may play a physiological role in viral replication or in the formation or maintenance of warts [16]. The marker has involved in endocytosis through regulation of early endosome migration as well as EGFR [17]. The EGFR binds Serum and tissue marker via a caveolin-binding motif of the kinase domain [18].

Close associations among the pigmented warts, mainly melanin blockade melanocytes and partly the homogeneous intracytoplasmic inclusion bodies seemed to have roles in the genesis of the clinical darkening of the lesions [19]. Serum and tissue marker localizes to melanocytes and its expression can be induced by UV exposure [20].

5. Conclusion

From the results of present study, it is concluded that there were no significant differences were found between studied groups regarding occupations. Hand was the most affected site (56.7%), followed by leg and thigh. Most of cases were affected by multiple lesions. Mean size was 6.2 mm.

6. Recommendations

The results of the current study should be interpreted in light of its limitations, as the present study included a relatively small sample size. Further studies are needed to the precise mechanisms by which serum and tissue level of marker contribute to the pathogenesis of common warts, and to assess the role of serum and tissue level of marker in treatment of common warts.

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