



ORIGINAL RESEARCH PAPER

Dermatology

SKIN TAGS AND INSULIN RESISTANCE AND ITS ASSOCIATION

KEY WORDS: Acrochordons, Diabetes Mellitus, Skin tags, insulin resistance.

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ABSTRACT

Skin tags are caused by friction between skin folds and or between skin and clothing. Skin tags are commonly seen in axilla, upper chest and beneath the breasts, neck, eye lids and groin folds. Skin tags are acrochordons are benign painless lesions, but manifest with symptoms when there is an abrasion or necrosis. Skin tags are dermatological lesions commonly found in the general population and have been associated with diabetes mellitus, obesity, insulin resistance and atherosclerosis. Early detection of patients with insulin resistance may play an important preventive role. To evaluate the association between skin tags in the neck or axillary regions and insulin resistance. This study was carried out as a cross sectional study in a Teaching hospital. This study was undertaken in the outpatient Department of Dermatology in our Teaching hospital. The prevalence of acrochordons showed in our study was 14.0% [95% CI: 8.4 to 19.5]. Acrochordons was absent in 129 (86.0%) participants. The prevalence of acrochordons in this study was 14% and majority of them presented as multiple lesions and around the neck. It was observed that history of diabetes mellitus, cardiovascular diseases and hypertension was significant risk factors for acrochordons. Our study demonstrated statistically significant results with uncontrolled diabetes mellitus.

INTRODUCTION:

Acrochordons or skin tags, also referred to as soft fibromas is a commonly occurring benign skin lesion which consists of a small portion of the skin projecting from the surrounding skin. [1] Certain variations in the estrogen levels and hormones such as IGF-1, Insulin and Transforming Growth Factor (TGF) and Epidermal Growth Factor (EGF) are also implicated in the incidence of skin tags. [2]. Insulin resistance is a metabolic disorder in which target cells fail to respond to normal levels of circulating insulin. Insulin resistance has been associated with presence of acanthosis nigricans and acrochordons. It is known that early diagnosis and early initial treatment are of paramount importance to prevent a series of future complications. These dermatoses may represent an easily identifiable sign of insulin resistance and non-insulin-dependent diabetes. Most of the times the ideology skin tags are unknown but it is said to have a link with paucity of elastic tissue resulting in sessile atrophic lesions. Hormonal imbalances and impaired carbohydrate metabolism are set to be the key pathogenic factors influencing the occurrence of acrochordons. It is very rare to find neoplasms associated with skin tags. [2]

Overall insulin resistance is responsible for influencing the development of skin tags. Insulin is known to promote tissue growth and also stimulates glucose regulation in the tissues at varied intensity. In the presence of insulin resistance, the cells respond less to the effect of the hormone. As a compensation the pancreas starts producing increased quantities of insulin and the hyper-insulinemia promotes release of several growth factors which initiates the development of fibroblastic growth which is activated by receptors and this explains the incidence of skin tags in patients with insulin resistance. [3] While skin tags are a resultant of insulin resistance the contrary is also important. Presence of skin tags may be a predictive response to detect response to insulin resistance and systemic manifestation. There are scarce researches which have been done to evaluate the presence of systemic conditions implicated in skin tags. This study was undertaken as a predictive assessment of prevalence of acrochordons.

Insulin resistance (IR) is a metabolic disorder in which target cells fail to respond to normal levels of circulating insulin, which results in compensatory hyperinsulinemia in an

attempt to obtain an appropriate physiological response. It is especially found in individuals with diabetes mellitus (DM) type 2, decompensated type 1 DM, diabetic ketoacidosis and obesity. 2-5 In normal populations, IR occurs in 20 to 25% of the individuals. There are three types of IR: (i) Type A, caused by a reduced number and dysfunction of insulin receptors; (ii) type B, caused by formation of antibodies against insulin receptors; and (iii) Type C, which corresponds to a post-receptor defect. Obese patients and patients with polycystic ovary syndrome (PCOS) have type-A insulin resistance. DM occurs when insulin secretory capacity fails to reduce serum glucose. Insulin concentrations are generally higher in early type 2 diabetes, but the levels are not enough to compensate for insulin resistance due to a pancreatic beta cell defect.

Insulin resistance increases during puberty and appears to be related to fat accumulation. The insulin receptor belongs to the family of tyrosine kinase receptors, which includes the insulinlike growth factor (IGF), epidermal growth factor (EGF), fibroblast growth factor (FGF), platelet-derived growth factor, colony-stimulating factor I and several cytokine receptors. A high concentration of insulin results in a direct and indirect activation of IGF-1 receptors in keratinocytes and fibroblasts, leading to their proliferation. Other mediators can contribute, including other tyrosine kinase receptors such as EGFR - epithelial growth factor receptor - and FGFR fibroblast growth factor receptor. Acrochordons are rarely examined for histopathology. The pathological examination reveals the papillary dermis, composed of loosely arranged collagen fibers and dilated capillaries and lymphatic, vessels with no appendageal structures. It is very rare to find a lesion presenting clinically as acrochordon but a component of acrochordons. In such cases it is often malignant melanoma, squamous cell carcinoma or basal cell carcinoma which is often referred to as fibroepithelioma of Pinkus which present as papule in the lower back. [4]

Evaluation of acrochordons involves clinical diagnosis and histopathological conformation followed by surgical management. The clinical diagnosis of acrochordons is done by physical appearance and clinical examination of the skin and surrounding area. The systemic evaluation of the acrochordons could give insight as to the probable cause and pathological risk factors especially with respect to systemic

diseases like diabetes mellitus and hypercholesterolemia. In recent times metabolic syndrome is also implicated as a key risk factor for the incidence of acrochordons. Histopathological confirmation may not be absolutely necessary in all patients and is warranted when there is increased suspicion regarding malignancies.

The prevalence of acrochordons has been documented all over the world. It was observed that skin tags were present in 0.9 to 1.2% of all dermatology consultations in 2006 in Brazil. Moreover, the occurrence of skin tags is seen to be increased in the elderly age group beyond 45 years of age and 46% of the cases are above 40 years. [5] Histologically acrochordon is a polypoid with overlying acanthotic epidermis with loose edematous fibrovascular core excepting mild chronic inflammation. [6] A detailed study of acrochordons is warranted in order to understand the etiology, pathogenesis and complications associated with skin tags. Though skin tags may affect individuals for cosmetic reasons, it is proposed to have serious underlying systemic manifestations which need to be explored. This study was carried out to Estimate the prevalence of skin tags and insulin resistance patients

Material and Methods:

This study was carried out as a cross sectional study in a Teaching hospital. This study was undertaken in the outpatient Department of Dermatology in our Teaching hospital. The study population consisted of all the patients who visited the outpatient department during the study period. Obtained from the Institutional Ethics Committee prior to the commencement of the study. Each participant was explained in detail about the study and informed consent was obtained prior to the data collection. The participants were selected using purposive sampling amongst the patients who visited the outpatient clinic of our Dermatology Department.

Inclusion criteria: Adults above 18 years of age. Both Sexes. Exclusion criteria: Children and Patients presenting with generalized skin disease like psoriasis, Erythroderma, Immunobullous disorder, Insulin resistance etc.

Statistical Analysis:

Data was entered and analyzed using SPSS version 15 software. Percentages were used to describe the prevalence of skin tags and systemic diseases. Chi – square was used to document the association between skin tags and systemic diseases. A p value less than 0.05 was considered to be statistically significant.

Results:

Table -1 Prevalence of acrochordons among the study participants (insulin resistance)

S. No	Acrochordon	Frequency (N=150)	Percentage (%)	95% CI
1	Present	21	14.0	8.5-19.9
2	Absent	129	86.0	80.65-91.58

Table-2 : Association between skin tag and systemic diseases.

S. No.	Parameter	Acrochordons		N (150)	Chi sq	P value
		Present n (%)	Absent n(%)			
1	Age					
	<40	3 (8.1)	34 (91.9)	37	1.4	0.254
	>40	18 (15.9)	95 (84.1)	113		
2	Sex					
	Male	17 (16.34)	87 (83.65)	104	1.55	0.161
	Female	4 (8.69)	42(91.30)	46		
3	Body Mass Index					
	>30	1 (16.7)	5 (83.3)	6	4.6	0.224

	24-29.9	13 (14.4)	77 (85.6)	90		
	18.5-24	3 (7.3)	38 (92.7)	41		
	<18.5	4 (30.8)	9 (69.2)	13		
4	Random Blood Sugar					
	>200	20 (13.7)	125 (86.3)	146	0.4	0.583
	<200	1 (25.0)	3 (75.0)	4		

DISCUSSION:

This study was carried out as cross-sectional study among the patients visiting the outpatient Dermatology Department of our teaching hospital. The study was carried out among 150 participants. Majority of participants belong to the age group > 40 years (75.3%) and 16.34% were males. Among the participants, majority of them (60.0%) were normal weight. In a study done by Bhargava et al, majority of the participants belonged to the age group of 31 to 40 years and were females which was similar to our study. [24] In a study done by Shrestha P et al majority of the participants were females (54.9%) and they belonged to the age group over 55 years (37.5%) which is similar to our study. [7] In a study done by Tameka A. et al majority of the participants were females (74.5%) and the mean age of the participants was around 50 years which is similar to our study. [8] In another study done by Maluki et al the majority of the participants in the study were females (68.63%) and the mean age of the participants was 38.6 years which is similar to our study. [9]

The prevalence of acrochordons in our study was 14.0%. Multiple skin tags were present in 57.1% of the participants and majority of the skin tags were located in the neck and chest region (38.1%). All the skin tags were hyperpigmented (100%). The size of the skin tags varied from 1 to 4 mm and it was observed that majority of the participants had a size of 2 mm (61.9%). A study done by EL Safouri et al the prevalence of skin tags of 59.3% which was higher than our study. In 21.1% of the participants with skin tags the color of the skin tags was hyperpigmented. [10] In a study done by Zawahry et al the site of presentation of skin tags reveal that the majority of the skin tags were present in the neck region (60%) followed by axilla and chest which is similar to our study results. [11] In a study done by Mustafa et al majority of the lesions were present beyond one site, which is similar to our study. In this study it was observed that majority of the participants had skin tags in the neck region (15%) followed by on the face (15%) majority of the patients (65%) of the skin tags were very small in size, which was similar to our study. Majority of the participants had a hyper pigmented skin tag (63.3%) which was similar to our study. [12]

In our study one of the objectives was to evaluate the association of acrochordons and the risk factors. We also analyzed the evaluated the risk of Body Mass Index as a risk factor for acrochordon. It was observed that participants with overweight and obesity were at increased risk for developing skin tags compared to participant with normal Body Mass Index. However, the observed association was statistically non-significant. It was observed that fasting blood sugar levels > 200mg/dl was a significant risk factor for the development of skin tags the association was not statistically significant (P > 0.005) we also evaluated the association between skin tags and the presences of known history of diabetes mellitus or hypertension or cardiovascular diseases. It was observed that known history of cardiovascular diseases was a risk factor and it increased with prevalence of skin tags (75.0%) compared to patients without with, no history of cardiovascular diseases (12.3%). The observed difference was statistically significant (p< 0.001). Known history of hypertension was significantly associated with the occurrence of skin tags. Participants with known history of hypertension had increased the prevalence of skin tags (29.6%) compared to participants with no history of hypertension (10.6%).

Skin tags are common tumors that usually affect middle-aged individuals and the elderly. They usually occur on the neck, armpits and groin. They are small soft and pedunculated protrusions. The lesions may be brown or skin-colored and range from 1mm to 1cm in diameter. Histologically, they are characterized by loss of collagen fibers and dilated blood capillaries. After the age of 40, the frequency of skin tags is 37%, being greater than in the general population, among which the frequency is 20 to 25%. Banik states that, although 46% of the general population has skin tags, only 14.4% have eight or more lesions on the body. In 2006, according to the region of the country, it was estimated that between 0.9% and 1.2% of the dermatologic diagnoses in Brazil referred to skin tags [13]. In individuals who have multiple skin tags, it is important to suspect of a disorder in the metabolism of carbohydrates, either in the form of insulin resistance or diabetes mellitus [14-15]

Our study demonstrated the prevalence and association of skin tags with certain systemic conditions. Studies have demonstrated that multiple skin tags are often associated with insulin resistance and obesity [16].

Presence of skin tags is associated with pregnancy, acromegaly, intestinal polyps, dyslipidemia and several syndromes. Individuals with skin tags have a high prevalence of thyroid nodules and thyroid with increased volume. This is because skin tags and thyroid changes may be associated with high levels of circulating insulin. Therefore obesity is a significant risk factor for skin tags. The reason for this difference could be because of the innate characteristic differences in the participants who visited the outpatient department. However, our study demonstrates the significant relationship between history of cardiovascular diseases, hypercholesterolemia, and the presence of skin tags, which has been substantiated by several other studies.

Lesions and skin tags should never be ignored, since they bring information about internal diseases and, therefore, can offer some guidance as to how to proceed about these diseases, preventing a series of future morbidities such as diabetes and atherosclerotic diseases. Although often disregarded by patients, since they are asymptomatic lesions, these dermatoses are of great importance and cannot go unnoticed in the clinical examination, since they can serve as indicators of the need to measure laboratory data that may lead to a diagnosis of insulin resistance.

Conclusion:

This study was carried out to evaluate the clinical presentation and associated risk factors for acrochordons in a Teaching hospital. The prevalence of acrochordons in this study was 14% and majority of them presented as multiple lesions and around the neck. We also evaluated the medical history, diabetic status and body mass index among the participants. It was observed that history of diabetes mellitus, cardiovascular diseases and hypertension was significant risk factors for acrochordons. Our study demonstrated statistically significant results with uncontrolled diabetes mellitus.

Insulin resistance has been associated with AN and AC, and it is known that early diagnosis and early treatment are of paramount importance to prevent a series of future manifestations. Reduction of insulin action may be accompanied by a group of metabolic disorders such as hypertension, hypertriglyceridemia, reduced HDL/cholesterol levels, carbohydrate intolerance, central obesity, increased plasminogen activator inhibitor-1 concentrations hyperuricemia and atherosclerotic cardiovascular disease. This set of changes is known as insulin resistance syndrome or metabolic syndrome. Its easy signal for tracking insulin resistance and non-insulin-dependent DM, with implications regarding changes in lifestyle and

adoption of early treatment.

Overall our study has thrown light upon the risk factors and presentation of acrochordons. This study has a large implication in creating awareness regarding the predictive efficacy of skin tags. Any program targeting prevention of non-communicable diseases may be substantially strengthened by providing knowledge regarding the skin tags.

References:

- [1] Millington GW, Graham-Brown RA. "Obesity and skin disease" in Skin and skin disease throughout life. In: Burns A, Breathnach S, Cox N, Griffiths CE, editors. Rook's textbook of dermatology. 8th ed. Oxford: Blackwell publishing;2010.
- [2] Usatine RP, Smith MA, Chumley HS, Mayeaux Jr. EJ. Color Atlas of Family Medicine. 2nd edition. Access Medicine. Skin tag. Chapter 157. The McGraw-Hill Companies.
- [3] Tamega AA, Aranha AMP, Guiotoku MM, Miot LDB, Miot HA. Association between skin tags and insulin resistance. An Bras Dermatol 2010;85(1):25-31.
- [4] Lipoff JB. StatPearls. Acrochordon. [Internet] Available from
- [5] Banik R, Lubach D. Skin tags: localization and frequencies according to sex and age. Dermatologica. 1987;174:180-3.
- [6] Pennys NS. Skin tags do not contain cutaneous nerves. Arch Dermatol. 1990 Dec; 126(12):1654-5.
- [7] Shrestha P, Poudyal Y, Rajbhandari SL. Acrochordons and diabetes mellitus: a case control study. NJDVL 2015;13(1):32-37
- [8] Tamega AA, Aranha AMP, Guiotoku MM, Miot LDB, Miot HA. Association between skin tags and insulin resistance. An Bras Dermatol 2010;85(1):25-31.
- [9] Maluki AH, Abdullah AA. Metabolic association of skin tags. Int J Dermatol Clin Res 2016;2(1):3-11.
- [10] ElSafoury O, Fawzi M, Abdel Hay RM, Hassan AS, El Maadawi Z, Rashed L. Increased tissue leptin hormone level and mast cell count in skin tags: a possible role of adipimmune in the growth of benign skin growths. Indian J Dermatol Venereol Leprol. 2010 Sep-Oct;76(5):538-42
- [11] El Zawahry, Abdallah MAR, Elmahdy HE. Study of possible relationship between skin tags and obesity in Egypt. The Egyptian Journal of Dermatology and Venereology 2013;33(1):18-21
- [12] Mustafa NAO, Ramadan ARMA, Alfarouk KO, Aljarbou A, Elhassan GO, Muddathir AK et al. Skin tags and atherogenic lipid profile in diabetes mellitus type 2 in Jabir Abu Eliz Diabetic Center. American Journal of Dermatology and Venereology 2017;6(3):41-50.
- [13] Demir S, Demir Y. Acrochordon and impaired carbohydrate metabolism. Acta Diabetol. 2002;39:57-59.
- [14] Jowkar F, Fallahi A, Namazi MR. Is there any relation between serum insulin and insulin-like growth factor-1 in non-diabetic patients with skin tag? J Eur Acad Dermatol Venereol. 2010;24:73-4.
- [15] Sociedade Brasileira de Dermatologia. Perfil nosologico das consultas dermatologicas no Brasil. An Bras Dermatol. 2006;81:549-58.
- [16] Austin MA, King MC, Vranizan KM, Krauss RM (1990) Atherogenic lipoprotein phenotype. A proposed genetic marker for coronary heart disease risk. Circulation 82:495-506