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Original Article

Acrochordon as a marker of metabolic syndrome – A cross-sectional study from South India

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ABSTRACT

Objectives: To determine the association of acrochordons with metabolic syndrome and its components.

Materials and Methods: A cross-sectional study was conducted in 100 patients with acrochordon and 100 age- and gender-matched controls who attended the dermatology outpatient department of a tertiary care center in South India from January 2017 to December 2017. A detailed dermatological examination was carried out in cases with respect to distribution, number, color, and morphology of acrochordons. Blood pressure (BP), pulse rate, waist circumference, height, weight, and body mass index were recorded in all cases and controls. Fasting lipid profile, fasting blood sugar, liver function test, and renal function test were done in all study participants. A diagnosis of metabolic syndrome was made based on the International Diabetes Federation metabolic syndrome worldwide definition specified for the Asian population. Statistical analysis was done using Pearson's Chi-square test.

Results: There were 52 females and 48 males in each group. About 80% of patients belonged to the age group of 20–50 years. A significantly higher number of cases had metabolic syndrome ($P < 0.001$). Acrochordons showed a significant association with the components of metabolic syndrome such as high BP ($P < 0.001$), high fasting plasma glucose levels ($P < 0.001$), and low levels of high-density lipoprotein cholesterol ($P = 0.04$). Comparison of cases showed that patients with acrochordons limited to axilla were less likely to have metabolic syndrome in comparison to those who had acrochordons on other body sites with or without involvement of axilla ($P = 0.008$). Patients who manifested only sessile lesions were less likely to have metabolic syndrome when compared to those who manifested pedunculated/filiform/pedunculated and filiform lesions ($P < 0.001$).

Limitations: A cross-sectional study design and study carried out in a tertiary referral center were the limitations.

Conclusion: A significant association was noted between acrochordons and metabolic syndrome.

Keywords: Acrochordons, Metabolic syndrome, Diabetes mellitus, Hypertension, Dyslipidemia

INTRODUCTION

Acrochordon or skin tag is a common, benign skin lesion which appears as a soft, skin-colored, or hyperpigmented protrusion on neck and major flexures.[1] Acrochordon is considered as a cutaneous marker of metabolic syndrome with increased risk of cardiovascular disease, stroke, and diabetes mellitus.[2] However, there are only a few studies from South India that have assessed the relation between acrochordon and metabolic syndrome, in spite of a high prevalence of metabolic syndrome in this region.[3,4]

In this comparative, cross-sectional study, we have attempted to determine the association between acrochordon and metabolic syndrome. We also tried to determine the relation between the clinical characteristics of acrochordons (distribution, number, color, and morphology) and metabolic syndrome.

MATERIALS AND METHODS

A cross-sectional study was carried out among consecutive 100 patients with acrochordons who attended the outpatient clinic of dermatology department of a tertiary referral center in South India from January 2017 to December 2017. One hundred age- and gender-matched healthy controls without acrochordons were randomly selected from those who accompanied the patients who attended the dermatology outpatient department during the same period. Patients with known endocrinopathies such as Cushing's syndrome, thyroid dysfunction, pheochromocytoma, and glucagonoma, patients with psoriasis, patients on systemic corticosteroids, and other drugs which could alter the metabolic parameters and pregnant females were excluded from both the groups. Ethics committee of the institution approved the study. Individual study participant gave written informed consent.

A pre-set proforma was used to collect data regarding patient characteristics and age of onset and duration of acrochordon. We recorded the personal and family history of hypertension, diabetes mellitus, hyperlipidemia, and coronary artery disease, in each study participant. We also noted the medications received by each study participant. We did a detailed clinical examination and recorded blood pressure (BP), pulse rate, waist circumference, height, weight, and body mass index (BMI). We classified the participants into those with normal BMI (BMI<25), overweight (BMI 25–29.9), and obese (BMI≥30).[5]

We documented the distribution, size, number, color, and morphology of acrochordons.

We determined the fasting lipid profile and fasting blood sugar (FBS) level in cases and controls.

Metabolic syndrome was diagnosed using the International Diabetes Federation metabolic syndrome worldwide definition as followed: [6]

Waist circumference of >90 cm in men and >80 cm in women plus any two of the following:

1. Triglycerides >150 mg/dl (1.7 mmol/l) or treatment for elevated triglycerides
2. High-density lipoprotein (HDL) cholesterol <40 mg/dl (1 mmol/l) in men or <50 mg/dl (1.3 mmol/l) in women, or treatment for low HDL
3. Systolic BP >130 mmHg or diastolic BP >85 mmHg or treatment for hypertension or previous diagnosis of hypertension
4. Fasting plasma glucose >100 mg/dl (5.6 mmol/l) or previously diagnosed Type 2 diabetes mellitus.

Data were entered into Microsoft Excel and analyzed with SPSS Inc. IBM Company version 18 Chicago, SPSS Inc. (United States of America). Descriptive data that included numbers and percentages were calculated for all the categories. Categorical data were analyzed by Pearson's Chi-square test. $P < 0.05$ was considered statistically significant.

RESULTS

The study participants included 52 women and 48 men in either group. About 80% of the patients belonged to the age group of 20–50 years [Table 1].

Duration of acrochordons was <2 years in 12 patients (12%) and longer than 6 years in 36 (36%). The majority (89/100, 89%) of the patients were asymptomatic. Nine (9%) patients complained of pruritus and 2 (2%) had pain. Three patients (3%) gave a history of rapid progression of acrochordons. Table 2 shows the clinical and laboratory profile of study participants.

Forty-three (43%) cases had skin tags on the neck alone and 35 (35%) had skin tags on multiple body sites [Table 3]. The majority of patients (69/100, 69%) had acrochordons of size <0.5 cm. Two (2%) patients had acrochordons which were more than 2 cm in size.

The number of acrochordons was 10 or <10 in most of the cases (73/100, 73%). The number of acrochordons was 11–15 in 10% (10/100) and more than 15 in 17% (17/100).

Forty-six patients (46%) had hyperpigmented skin tags, 45 (45%) had skin-colored lesions and single patient (1%) with vitiligo had depigmented lesions. Both skin-colored and hyperpigmented (mixed) skin tags were seen in 8 (8%) patients.

Forty-seven (47%) patients showed pedunculated acrochordons, 16 (16%) had sessile, dome-shaped lesions, 35 (35%) had both pedunculated and sessile lesions, and 2 (2%) had pedunculated and filiform lesions.

A statistically significant association was noted between the presence of acrochordons and family history of acrochordons ($P < 0.001$), personal habits of smoking ($P = 0.02$), consumption of alcohol ($P < 0.001$), personal history of hypertension ($P = 0.01$),

Table 1: Age distribution of cases with acrochordons.

Age in years	Number of patients (percentage)
0–20	0 (0)
21–30	9 (9)
31–40	34 (34)
41–50	34 (34)
51–60	13 (13)
>60	10 (10)

Table 2: Comparison of study participants with and without acrochordons.

Features	Study participants with acrochordons, *n* = 100 (100%)	Study participants without acrochordons, *n* = 100 (100%)	*P*-value
Family history of acrochordons	47 (47)	7 (7)	<0.001
Smoking	25 (25)	11 (11)	0.02
Consumption of alcohol	27 (27)	4 (4)	<0.001
Diabetes mellitus	20 (20)	10 (10)	0.07
Hypertension	20 (20)	7 (7)	0.01
Dyslipidemia	8 (8)	0 (0)	0.01
Coronary artery disease	6 (6)	0 (0)	0.04
Waist circumference >90 cm in men and >80 cm in women	77 (77)	72 (72)	0.52
BP >130/85 mmHg	45 (45)	13 (13)	<0.001
BMI ≥25 kg/m^2	54 (54)	37 (37)	0.02
Total cholesterol >200 mg/dl	44 (44)	43 (43)	0.89
LDL cholesterol >130 mg/dl	41 (41)	35 (35)	0.47
Triglycerides >150 mg/dl	39 (39)	36 (36)	0.77
HDL cholesterol <40 mg/dl (male), <50 mg/dl (female)	42 (42)	27 (27)	0.04
Fasting plasma glucose >100 mg/dl	61 (61)	26 (26)	<0.001
Metabolic syndrome	65 (65)	28 (28)	<0.001

BP: Blood pressure, BMI: Body mass index, HDL: High-density lipoprotein, LDL: Low-density lipoprotein

dyslipidemia ($P = 0.01$), and coronary artery disease ($P = 0.04$) [Table 2].

Metabolic syndrome was more common in those with acrochordons (65%) when compared to controls (28%). The difference was significant ($P < 0.001$), [Table 2].

Among the components of metabolic syndrome, a significant association was noted between the presence of acrochordons and BP >130/85 mmHg ($P < 0.001$), low HDL cholesterol ($P = 0.04$), and fasting plasma glucose >100 mg/dl ($P < 0.001$) [Table 2].

Metabolic syndrome did not show any association with either the duration, or the evolution of acrochordons (whether the lesions showed a gradual or sudden onset).

Intragroup comparison of cases with respect to the distribution of acrochordons showed that those who manifested acrochordons limited to the axilla showed a significantly lower frequency of metabolic syndrome ($P = 0.008$) and its components such as increased waist circumference ($P < 0.001$), elevated triglyceride level ($P = 0.01$), high BP ($P = 0.004$), and elevated fasting plasma glucose level ($P = 0.03$) when compared to those who had lesions on other body sites with or without involvement of axilla [Table 3]. Comparison of cases with respect to the number of acrochordons showed no significant difference between those who had up to 10 and more than 10 lesions. No significant association was noted between the size of acrochordon and metabolic syndrome or its components. A significantly higher percentage of cases with coexistence of hyperpigmented and skin-colored acrochordons had elevated triglycerides ($P < 0.001$), low HDL ($P < 0.001$), and high BP ($P = 0.001$) in comparison those who showed only hyperpigmented or skin-colored or depigmented lesions [Tables 4 and 5]. A significant association was noted between the morphology of acrochordons and the frequency of metabolic syndrome, waist circumference, serum triglyceride level, serum HDL level, and fasting plasma glucose level. Less number of patients who manifested only sessile acrochordons had metabolic syndrome ($P < 0.001$) and its components such as increased waist circumference ($P < 0.001$), elevated triglyceride level ($P = 0.02$), low HDL ($P < 0.001$), and elevated plasma glucose level ($P = 0.002$), in comparison to those who manifested coexistence of pedunculated and sessile or pedunculated or pedunculated and filiform lesions [Tables 4 and 5].

DISCUSSION

In our study, more than 60% of patients belonged to the age group of 31–50 years. Safoury *et al*., have noted an increase in mean number of acrochordons with age, which reached a peak at 40–50 years.[7]

We noted a slight female preponderance (1.1:1) among patients with acrochordon. This was comparable to a previous study from India, though a marked female predominance was reported by others.[8,9]

Our observation of 65% of cases manifesting metabolic syndrome was higher than the 42% noted in the previous studies from South India in patients with acrochordons as well as in other diseases like psoriasis.[10,11]

Table 3: Distribution of acrochordons in cases with and without metabolic syndrome or its components.

Study participants with acrochordons		Distribution of acrochordons					
		Only neck *n*=43 (100%)	Only axilla *n*=9 (100%)	Only abdomen *n*=8 (100%)	Only shoulder *n*=3 (100%)	Only thigh *n*=2 (100%)	Multiple sites *n*=35 (100%)
Metabolic syndrome	Yes *n*=65	27 (62.8)	2 (22.2)	6 (75)	3 (100)	2 (100)	25 (71.4)
	No *n*=35	16 (37.2)	7 (77.8)	2 (25)	0 (0)	0 (0)	10 (28.6)
Waist circumference >90 cm in men or >80 cm in women	Yes *n*=77	31 (72.1)	2 (2.2.2)	8 (100)	3 (100)	2 (100)	31 (88.6)
	No *n*=23	12 (27.9)	7 (77.8)	0 (0)	0 (0)	0 (0)	4 (11.4)
Triglycerides >150 mg/dl or treatment for elevated triglycerides.	Yes *n*=39	22 (51.2)	0 (0)	4 (50)	1 (33.3)	0 (0)	12 (34.3)
	No *n*=61	21 (48.8)	9 (100)	4 (50)	2 (66.7)	2 (100)	23 (65.7)
HDL cholesterol <40 mg/dl in men or <50 mg/dl in women, or treatment for low HDL	Yes *n*=42	11 (25.6)	2 (22.2)	6 (75)	3 (100)	2 (100)	18 (51.4)
	No *n*=58	32 (74.4)	7 (77.8)	2 (25)	0 (0)	0 (0)	17 (48.6)
Systolic BP >130 mmHg or diastolic BP >85 mmHg or treatment for hypertension or previous diagnosis of hypertension	Yes *n*=45	17 (39.5)	0 (0)	4 (50)	2 (66.7)	2 (100)	20 (57.1)
	No *n*=55	26 (60.5)	9 (100)	4 (50)	1 (33.3)	0 (0)	15 (42.9)
Fasting plasma glucose >100 mg/dl or previously diagnosed type 2 diabetes mellitus	Yes *n*=61	29 (67.4)	2 (22.2)	2 (25)	2 (66.7)	2 (100)	24 (68.6)
	No *n*=39	14 (32.6)	7 (77.8)	6 (75)	1 (33.3)	0 (0)	11 (31.4)

We found that increased waist circumference (77%), high FBS (61%), high BP (45%), and low levels of HDL (42%) contributed to a higher percentage of metabolic syndrome in our cases with acrochordons.

Increased waist circumference was noted in a majority (77%) of cases, but there was no significant difference from control group, which was contradictory to the previous studies.[10,12] However, on calculating BMI, 42% of the cases were overweight and 12% were obese which were significant and in accordance with other studies.[8,13] Plausible mechanisms for higher prevalence of acrochordons in obesity are hyperinsulinemia and increased leptin levels.[14]

A high fasting blood glucose noted in 61% of our patients was comparable to many previous studies.[2,7,12,15-17] The significant lipid abnormality noted in our patients was a low HDL, which was concurrent with other studies.[7,9] Low levels of HDL irrespective of the serum levels of total cholesterol or low-density lipoprotein are considered as the strongest predictor of cardiovascular morbidity.[18] We observed a high prevalence of hypertension in 45% of cases while a previous Indian study reported a frequency of 33% for the same.[10]

Srivastava *et al*., reported that lesions over thigh, neck, and axilla were more likely to have metabolic syndrome.[10] This was contrary to our observation of cases manifesting acrochordons limited to axilla showing a significant negative association with metabolic syndrome and its components such as abnormal waist circumference ($P < 0.001$), elevated triglyceride level ($P = 0.01$), high BP ($P = 0.004$), and elevated fasting plasma glucose level ($P = 0.03$) when compared to those who had lesions on other body sites with or without involvement of axilla.

The number or size of acrochordon showed no significant association with metabolic syndrome in our study. This was discordant with the observation of Rasi *et al.,* who documented an association between number of acrochordons and high fasting plasma glucose level.[19]

The lack of association between color of acrochordons and metabolic syndrome as observed by us was comparable to the previous studies.[1,2] However, we noted a significant positive association between coexistence of hyperpigmented and skin-colored acrochordons and serum levels of triglycerides ($P < 0.001$), HDL ($P < 0.001$), and BP ($P = 0.001$).

Table 4: Number, color, and morphology of acrochordons in cases with and without metabolic syndrome or its components.

Study participants with acrochordons		Number of acrochordons		Color of acrochordons				Morphology of acrochordons			
		1–10 *n*= 73 (100%)	>10 *n*=27 (100%)	Hyperpigmented *n*=46 (100%)	Skin colored *n*=45 (100%)	Depigmented *n*=1 (100%)	Mixed *n*=8 (100%)	Pedunculated *n*=47 (100%)	Sessile *n*=16 (100%)	Pedunculated and sessile *n*=35 (100%)	Pedunculated and filiform *n*=2 (100%)
Metabolic syndrome	Yes *n*=65	44 (60.3)	21 (77.8)	31 (67.4)	25 (55.5)	1 (100)	8 (100)	34 (72.3)	4 (25)	27 (77.1)	0 (0)
	No *n*=35	29 (39.7)	6 (22.2)	15 (32.6)	20 (44.4)	0 (0)	0 (0)	13 (27.7)	12 (75)	8 (22.9)	2 (100)
Waist circumference >90 cm in men or >80 cm in women	Yes *n*=77	54 (74)	23 (85.2)	33 (71.7)	35 (77.8)	1 (100)	8 (100)	42 (89.4)	4 (25)	31 (88.6)	0 (0)
	No *n*=23	19 (26)	4 (14.8)	13 (28.3)	10 (22.2)	0 (0)	0 (0)	5 (10.6)	12 (75)	4 (9.7)	2 (100)
Triglycerides >150 mg/dl or treatment for elevated triglycerides	Yes *n*=39	29 (39.7)	10 (43.5)	16 (34.8)	17 (37.8)	1 (100)	5 (62.5)	23 (48.9)	2 (12.5)	14 (40)	0 (0)
	No *n*=61	44 (60.3)	17 (56.5)	30 (65.2)	28 (62.2)	0 (0)	3 (37.5)	24 (51.1)	14 (87.5)	21 (60)	2 (100)
HDL cholesterol <40 mg/dl) in men or <50 mg/dl in women, or treatment for low HDL	Yes *n*=42	30 (41.1)	12 (44.4)	19 (41.3)	14 (31.1)	1 (100)	8 (100)	22 (46.8)	0 (0)	18 (51.4)	2 (100)
	No *n*=58	43 (58.9)	15 (55.6)	27 (58.7)	31 (68.9)	0 (0)	0 (0)	25 (53.2)	16 (100)	17 (48.6)	0 (0)
Systolic BP >130 mmHg or diastolic BP >85 mmHg or treatment for hypertension or previous diagnosis of hypertension	Yes *n*=45	29 (39.7)	16 (59.3)	22 (47.8)	15 (33.3)	0 (0)	8 (100)	16 (34)	5 (31.3)	24 (68.6)	0 (0)
	No *n*=55	44 (60.3)	11 (40.7)	24 (52.2)	30 (56.7)	1 (100)	0 (0)	31 (66)	11 (68.8)	11 (31.4)	2 (100)
Fasting plasma glucose >100 mg/dl or previously diagnosed type 2 diabetes mellitus	Yes *n*=61	41 (56.2)	20 (74)	31 (67.4)	25 (55.6)	0 (0)	5 (62.5)	29 (61.7)	4 (25)	28 (80)	0 (0)
	No *n*=39	32 (43.8)	7 (25.9)	15 (32.6)	20 (44.4)	1 (100)	3 (37.5)	18 (38.3)	12 (75)	7 (20)	2 (100)

Table 5: Relation between distribution, color, and morphology of acrochordons and metabolic syndrome or its components.

Compared feature		Site of acrochordons			Color of acrochordons			Morphology of acrochordon		
		Acrochordons limited to axilla, *n*=9 (100%)	Acrochordons involving other body sites with or without involvement of axilla, *n*=91 (100%)	*P*-value	Patients manifesting hyperpigmented/ skin-colored/ depigmented acrochordons, *n*=92 (100%)	Coexistence of hyperpigmented and skin-colored acrochordons, *n*=8 (100%)	*P*-value	Patients manifesting only sessile acrochordons, *n*=16 (100%)	Patients manifesting pedunculated or filiform acrochordons with or without sessile acrochordons *n*=84 (100%)	*P*-value
Metabolic syndrome	Yes *n*=65	2 (22.9)	63 (69.2)	0.008	57 (62)	8 (100)	0.05	4 (25)	61 (72.6)	<0.001
	No *n*=35	7 (77.1)	28 (30.8)		35 (38)	0 (0)		12 (75)	23 (27.4)	
Waist circumference >90 cm in men or >80 cm in women	Yes *n*=77	2 (22.9)	75 (82.4)	<0.001	69 (75)	8 (100)	0.19	4 (25)	73 (86.9)	<0.001
	No *n*=23	7 (77.1)	16 (17.6)		23 (25)	0 (0)		12 (75)	11 (13.1)	
Triglycerides >150 mg/dl or treatment for elevated triglycerides.	Yes *n*=39	0 (0)	39 (42.9)	0.01	31 (33.7)	8 (100)	<0.001	2 (12.5)	37 (44)	0.02
	No *n*=61	9 (100)	52 (57.1)		61 (66.3)	0 (0)		14 (87.5)	47 (66)	
HDL cholesterol <40 mg/dl in men or <50 mg/dl in women, or treatment for low HDL	Yes *n*=42	2 (22.9)	40 (44)	0.30	34 (37)	8 (100)	<0.001	0 (0)	42 (50)	<0.001
	No *n*=58	7 (77.1)	51 (56)		58 (63)	0 (0)		16 (100)	42 (50)	
Systolic BP >130 mmHg or diastolic BP >85 mmHg or treatment for hypertension or previous diagnosis of hypertension	Yes *n*=45	0 (0)	45 (49.5)	0.004	37 (40.2)	8 (100)	<0.001	5 (31.3)	40 (47.6)	0.28
	No *n*=55	9 (100)	46 (50.5)		55 (59.8)	0 (100)		11 (68.7)	44 (52.4)	
Fasting plasma glucose >100 mg/dl or previously diagnosed type 2 diabetes mellitus	Yes *n*=61	2 (22.9)	59 (64.8)	0.03	56 (60.9)	5 (55.6)	1.00	4 (25)	57 (67.9)	0.002
	No *n*=39	7 (77.1)	32 (35.2)		36 (39.1)	3 (37.5)		12 (75)	27 (30.1)	

Morphological patterns of acrochordon and its relation with metabolic syndrome are rarely reported. One previous study found no significant association between the two.[10] We found that patients with sessile acrochordons were less likely to manifest metabolic syndrome ($P < 0.001$) or its components such as increased waist circumference ($P < 0.001$), elevated triglyceride level ($P = 0.02$), low HDL ($P < 0.001$), and elevated plasma glucose level ($P = 0.002$) in comparison to those with other morphological types.

Limitations

Small sample size, cross-sectional study design, and study carried out in a tertiary referral center were the limitations.

CONCLUSION

In a comparative, cross-sectional study of 100 cases and 100 age- and gender-matched controls, we found a significant association between the presence of acrochordons and metabolic syndrome. Comparing cases with respect to distribution, number, color, and morphology of acrochordons, we found a significant association between distribution of acrochordons and metabolic syndrome and also between morphology of acrochordons and metabolic syndrome.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

Dr. Anza Khader is on the editorial board of the Journal.

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