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Original Article

Metabolic syndrome in vitiligo patients among a semi-urban Maharashtrian population: A case control study

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ABSTRACT

Aim: To assess the prevalence of metabolic syndrome and its correlation with the severity and duration of vitiligo.
Methods: One hundred vitiligo patients and 100 age-and-sex matched controls were included, whose waist circumference and blood pressure were measured; fasting serum cholesterol, triglycerides and glucose levels quantified; disease severity assessed and metabolic syndrome defined by National Cholesterol Education Program (NCEP) criteria.
Results: Metabolic syndrome (24%:12%), hypertriglyceridemia (41%:24%), impaired glucose tolerance (25%:16%) [$P < 0.05$] and low HDL ($P = 0.044$) were significantly more prevalent in cases as compared to controls as were the mean values of triglycerides and fasting blood sugar. Increased mean age of vitiligo patients correlated with the presence of metabolic syndrome.
Conclusion: Metabolic syndrome had significant presence in but remained unaffected by the severity of vitiligo in our study patients.

1. Introduction

Vitiligo—from Latin 'vitium', meaning fault, or "vitelius" meaning, spotted calf [1]—is an acquired, depigmenting, idiopathic disease, resulting from the progressive loss of dihydroxyphenylalanine- positive melanocytes in the basal layer of epidermis and is clinically characterized by milky-white sharply demarcated macules/patches [2].

Vitiligo has recently been classified into 3 major forms—non-segmental, segmental and undetermined/unclassified [2]. Non-segmental vitiligo, by far the commonest form, is increasingly being considered a systemic disorder, rather than a mere depigmenting dermatosis, due to growing evidence of genetic, immunological, cytotoxic, neuronal, and inflammatory mechanisms in its complex multifactorial pathogenesis [3]. Among the many additional hypotheses put forward, lipid peroxidation—resulting from diminished scavenging of reactive oxygen species (ROS) by reduced number of melanocytes in the adipose tissue and having a significant role in the pathogenesis of metabolic syndrome—has also been shown to contribute to its pathogenesis, thereby raising the possibility of concurrence of metabolic syndrome and vitiligo [4]. The studies on this concurrence being scarce in English literature, one such was undertaken by us.

2. Material and methods

After obtaining clearance from the Ethics Committee of our tertiary care institute, a total of one hundred patients aged >20 years and diagnosed by a dermatologist as having non-segmental vitiligo attending our dermatology outpatient were included in the study. Pregnant and lactating women were excluded. Equal number of controls were selected from among healthy volunteers awaiting cosmetic procedures. A detailed history including age, gender, smoking/alcohol consumption, diabetes mellitus, hypertension, onset of vitiligo and concomitant medications was taken. General physical examination including recording of weight, height, body mass index (BMI), blood pressure and waist circumference was done. Waist circumference was measured—by using a non-stretchable measuring tape—as the smallest horizontal girth between the lower costal margins and the iliac crests at minimal respiration at the end of normal expiration, the subjects standing erect in a relaxed position with both feet together on a flat surface. Blood pressure was recorded as the average of two measurements after subjects have been sitting for five minutes. Blood for estimating glucose and lipid profile was taken after the patients had fasted for 12 h.

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Table 1
Characteristics of cases and controls.

Parameters		Cases (n = 100)	Controls (n = 100)	P Value
Age (yrs)	Mean ± SD	43.5 ± 10.5	42.3 ± 11.5	0.43
	Range	24–67	21–68	
Gender	Male	66	64	0.77
	Female	34	36	
Height (cm)	Mean ± SD	164.13 ± 9.94	164.06 ± 8.34	0.95
	Range	135–188	148–184	
Weight (kg)	Mean ± SD	63.98 ± 10.83	65.73 ± 11.19	0.26
	Range	36–104	42–92	
Body mass index (kg/m^2)	Mean ± SD	24.13 ± 3.75	23.91 ± 3.66	0.68
	Range	16.44–38	15.24–33.46	
Smoking		25	19	0.31
Alcohol		34	27	0.28
Metabolic syndrome		24	12	0.027
Waist circumference (cm)	Mean ± SD	81.5 ± 10.9	81.82 ± 8.41	0.83
	Range	52–110	62–103	
Systolic blood pressure (mmHg)	Mean ± SD	122.20 ± 9.92	122 ± 9.67	0.88
	Range	100–142	100–142	
Diastolic blood pressure (mmHg)	Mean ± SD	78.42 ± 6.86	78.32 ± 6.70	0.92
	Range	60–94	60–94	
Fasting blood sugar (mg/dl)	Mean ± SD	98.12 ± 28.50	90.95 ± 16.29	0.03
	Range	64–230	70–170	
Triglycerides (mg/dl)	Mean ± SD	144.54 ± 47.61	133.34 ± 29.85	0.048
	Range	55–300	88–229	
HDL (mg/dl)	Mean ± SD	42.14 ± 5.92	44.11 ± 7.68	0.044
	Range	30–60	32–57	

Vitiligo disease activity (VIDA) score was obtained on the basis of opinion of the individual patient regarding his present disease activity over time. This disease activity involves either expansion of existing lesions or appearance of new lesions, graded on the six point VIDA scale ranging from +4, activity of 6 weeks or less duration; +3, activity of 6 weeks to 3 months; +2, activity of 3–6 months; +1, activity of 6–12 months; 0, stable for 1 year or more; and −1, stable with spontaneous repigmentation since 1 year or more.

Metabolic syndrome was diagnosed based on revised National Cholesterol Education Program Adult Treatment Panel III criteria which require the presence of three or more of: waist circumference >90 cm in men or >80 cm in women; serum triglycerides >150 mg/dl (1.7 mmol/l); high density lipoprotein (HDL) cholesterol <40 mg/dl (<1.0 mmol/l) in men or <50 mg/dl (1.3 mmol/dl) in women; blood pressure >130/85 mmHg and fasting plasma glucose of >100 mg/dl (6.1 mmol/l).

The statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 20 (SPSS Inc., Chicago, IL, USA). Spearman Rank Correlation test was used for correlation between the variables. A two-tailed $P < 0.05$ was considered significant.

3. Results

The study included 100 cases and 100 controls. The age of the cases ranged from 24 to 67 (mean: 43.5 ± 10.5) years and of the controls, 21 to 68 (mean: 42.3 ± 11.5) years; the male/female ratio of cases being 1.94:1 and controls, 1.77:1 [Table 1].

Waist circumference of cases ranged from 52 to 110 cm and of controls, 62 to 103 cm. Prevalence of obesity neither differed nor correlated significantly with increasing age, gender, smoking, or alcohol intake of either the cases or controls. The mean values of waist circumference in cases (81.5 ± 10.9) and controls (81.82 ± 8.41), too, were similar (P = 0.83) [Table 1].

The triglyceride levels in cases ranged from 55 to 300 mg/dl and in controls, 88 to 229 mg/dl; percentage of cases (41%) with hypertriglyceridemia as compared to controls (24%) was significant (P = 0.01) [Table 2] as were the mean triglyceride levels (P = 0.048) in cases (144.54 ± 47.61) than controls (133.34 ± 29.85) [Table 1].

HDL levels ranged from 30 to 60 mg/dl in cases and 32 to 57 mg/dl in controls. Mean HDL levels was significantly low (P = 0.044) in cases (42.14 ± 5.92) than controls (44.11 ± 7.68) [Table 1].

The mean systolic and diastolic blood pressures of cases (122.20 ± 9.92; 78.42 ± 6.86 mmHg), did not differ significantly (p > 0.05) from that in controls (122 ± 9.67 mmHg, P = 0.88; 78.32 ± 6.70 mmHg, P = 0.92)

Fasting blood glucose levels in cases (98.12 ± 28.50) were significantly higher than that in controls (90.95 ± 16.29 mg/dl; P = 0.03) [Table 1]. Impaired glucose tolerance was present in 25 cases and 16 controls (P < 0.05) [Table 2]. Metabolic syndrome, too, was significantly more prevalent in cases (24%) than controls (12%) (OR 2.32; $P < 0.05$) and the mean age of patients with metabolic syndrome was significantly higher than those without it (50.08 years versus 43.32 years; P < 0.001).

Our study found no association (p = 0.072) between metabolic syndrome and severity of vitiligo as per VIDA in cases as tabulated [Table 3].

Table 2
Comparative analysis of metabolic syndrome and its components in cases and controls.

Components	Cases (n = 100)	Controls (n = 100)	Odds ratio (95% CI)	P value
Metabolic syndrome	24	12	2.32(1.08–4.94)	P = 0.027
Triglyceride levels >150 mg/dl	41	24	2.20(1.19–4.04)	P = 0.01
Fasting plasma glucose >100 mg/dl	25	16	1.75(0.87–3.53)	P = 0.12
HDL cholesterol <40 mg/dl in males and <50 mg/dl in females	58	53	1.22 (0.70–2.14)	P = 0.48
Systolic blood pressure >130 mmHg	13	12	1.10 (0.47–2.53)	P = 0.83
Diastolic blood pressure >85 mmHg	15	14	1.08 (0.49–2.38)	P = 0.84
Waist circumference >90 cm in males and >80 cm in females	37	31	1.31(0.72–2.35)	P = 0.37

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