Dermatological manifestations of chronic venous insufficiency: A cross-sectional study from a Centre in South India

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Abstract

Background: Chronic venous insufficiency (CVI) describes a condition that affects the venous system of the lower extremities with venous hypertension causing various pathologies including pain, edema, skin changes and ulceration. Amongst these, skin changes are one of the earliest signs. In India, it is an underestimated cause of morbidity causing work place absenteeism although exact statistics are unavailable.

Objectives: To study the dermatological manifestations of CVI and correlate it with Venous Doppler scan findings.

Methods: 100 patients with CVI were selected for the study and a detailed history-taking with clinical examination was conducted. A Venous Doppler scan was performed and the findings were correlated clinically.

Results: In our study, the distribution of subjects were 4 females (33.3%) of CEAP clinical grade C3, 58(70%) males and 4(33.3%) females of clinical grade C4a, 9 (10.2%) males and 2(16.7%) females of clinical grade C4b, 3 (3.4%) males of clinical grade C5, 18 (20.4%) males and 2(16.7%) females of clinical grade C6.The Venous Doppler imaging of the affected limbs of patients showed significant clinical correlation.(*p<0.01)*

Conclusion: Chronic venous insufficiency is an underestimated public health problem. The risk factors found to be associated with development of CVI in the study were age, gender, obesity, pregnancy, family history, occupation involving prolonged orthostasis and smoking. The common clinical manifestations of CVI observed were edema, stasis eczema, lipodermatosclerosis (LDS) and venous ulcers. Venous Doppler Ultrasonography of affected limbs showed that frequency of reflux increased with severity of visible signs of disease.

Keywords: Chronic venous insufficiency, Risk factors, Venous doppler ultrasonography.

Introduction

The peripheral venous system of the human body serves as a reservoir to store blood and as a conduit to return blood to the heart. Proper functioning of the peripheral venous system depends on the patency of a series of one-way valves and muscle pumps. In the erect position, blood that enters into the lower extremity venous system must travel mainly against gravity to return to the central circulation. In a normal venous reflux, the resting standing venous pressure is approx. 80-90 mm Hg which drops to 20-30 mm Hg with calf exercise. There is a gradual return in pressure with refill time taking > 20 seconds. While in an abnormal venous reflux, the resting standing pressure is usually higher and venous refill time is < 20 seconds. Venous pathology develops when return of blood is impaired and venous pressure is increased. This may occur through several mechanisms including valvular incompetence, venous obstruction or both.

Chronic venous insufficiency (CVI) describes a condition in which persistent ambulatory venous hypertension in the lower extremities cause various pathologies including pain, edema, skin changes and ulceration. It often indicates the more advanced form of chronic venous disorders, including manifestations such as hyperpigmentation, venous eczema, lipodermatosclerosis (LDS), atrophie blanche and healed or active ulcers.[1] Skin changes are one of the earliest signs of venous hypertension. Some of the changes such as venous eczema are common and easily identified whereas changes such as Pseudo Kaposi sarcoma are more difficult to diagnose.[2]

According to studies conducted in the west, the prevalence of CVI vary from <1 to 40% in females and <1 to 17% in males.[3] The more serious consequences of CVI such as venous ulcers have an estimated prevalence of ~1% of the adult population.[1,4] In India, one of the underestimated causes of morbidity, work place absenteeism leading to economic burden for the patient, has been the growing threat of chronic venous diseases including CVI. Unfortunately, we do not have exact statistics for the Indian population.[5]

Among the several classification systems used to describe the severity of CVI are CEAP classification, Venous Clinical Severity Score (VCSS) and Widmer classification. Though opinions vary among different clinicians, many refer to CVI as CEAP clinical grades C3 to C6.[3] Established risk factors for the development of CVI include older age, female gender, pregnancy, family history of venous disease, obesity, smoking and standing occupation. Yet there are several factors that are not well documented such as diet, physical activity and exogenous hormone use.[3] Venous duplex imaging is a popular non-invasive tool used for assessing the etiology and severity of CVI. The treatment options for CVI vary

from conservative measures, medical management to surgical interventions.

Knowledge into the venous pathophysiology, how the disease develops, and the true quality of life (QoL) benefits of the various treatment options are largely unknown to the population.[6] Given the prevalence and socioeconomic impact of CVI, an understanding of the clinical manifestations is warranted.[1]

Methods

This was a descriptive study conducted among 100 newly diagnosed and untreated cases of CVI attending the Dermatology OPD of a tertiary care center in South India during the period from November 2014 to August 2016. Informed consent of each patient was obtained. A detailed history of each patient was taken, general examination and detailed dermatological examination were conducted and entered in a proforma. CEAP clinical classification was used for clinical grading of each patient (Table 1).[7] Routine blood investigations and skin biopsy in relevant cases were performed. Venous Doppler ultrasonography was performed for all patients and only reflux in the great saphenous vein, saphenofemoral junction and saphenopopliteal junction were considered for evaluation and comparison. In case of patients with symptoms in both legs, the more severely affected limb was considered for analysis. Clinical photographs of each patient were taken using a Google Nexus 5 camera of 8 MP resolution. Patients were treated and advised appropriately and asked to follow up. The Institution Ethics Committee clearance had been obtained for the study.

Table 1: CEAP Classification

C Clinical Status		**E Etiology**		**A Anatomy**		**P Pathophysiology**	
C0	No Visible Disorder	Ec	Congenital	As	Superficial	Pr	Reflux
C1	Telangiectases or Reticular Veins	Ep	Primary	Ap	Perforated	Po	Obstruction
C2	Varicose Veins	Es	Secondary (Post-thrombotic)	Ad	Deep	Pr,O	Combination
C3	Oedema	En	No known venous etiology	An	No known venous location	Pn	No known venous pathophysiology
C4a	Pigmentation, Oedema						
C4b	Lipo-et Dermatosclerosis, White Atrophy						
C5	Healed Ulcer						
C6	Active, Venous Ulcer						
S **A**	Symptomatic Asymptomatic						

Inclusion and exclusion criteria: Both male and female patients with CVI belonging to the age group of 20- 80 were selected for the study.

Treated cases of CVI, congenital and post thrombotic venous disease, arterial and neuropathic diseases were excluded.

Statistical analysis: The data collected was entered in an Excel database (Microsoft Inc, Redmond, Washington) and analyzed using R software (R Foundation for Statistical Computing, Vienna, Austria). The statistical test used was the Pearson's chi-squared test.

Results

Among the 100 patients included in the study, 28% of the patients belonged to the age group 40-49, 26% belonged to the age group 50-59, 25% came under the age group 30-39 while 19% of cases belonged to the age group 60-65. We had 88 males and 12 females willing to participate in the study. Males outnumbered female by a ratio of 7.3:1.

In the study, prickling sensation was present in 64% of patients, itching in 40%, pain in 35%, ulcer in 20% , swelling of legs in 14%, heaviness of limbs and skin tightening were present in 6% of patients each and 2% complained of burning sensation.

We had 1(8.3%) female from amongst the 12 females in the study with <2 pregnancies while the remaining 91.7% were multipara. The occupation-wise distribution of the study population was as follows: security guards (21%), shopkeepers (14%), hotel workers (11%), housewives (9%), drivers (8%) followed

by conductors (5%), farmers (5%), salesmen(5%), civil engineers (5%), coolie (4%), factory workers (2%), construction workers (2%), police officers (2%) and miscellaneous occupations (7%) including barber, supervisor, fish seller. Majority of the patients gave a history of prolonged standing.

In the study, 28 patients including 26(29.5%) males and 2(16.7%) females gave a family history of varicose veins. While 46.6% of men and 50% of women were overweight, 13.6% and 16.7% of men and women respectively were obese, rest of the patients had a normal BMI.

In the study, the distribution of subjects according to CEAP clinical grading was as follows: 4 females (33.3%) of CEAP clinical grade C3, 58(70%) males and 4(33.3%) females of grade C4a, 9 (10.2%) males and 2(16.7%) females of grade C4b, 3 (3.4%) males of grade C5, 18 (20.4%) males and 2(16.7%) females of grade C6. Table 2 shows the prevalence of CVI according to CEAP clinical classification in relation to age, gender, parity, family history and BMI.

Table 2: Prevalence of CVI according to CEAP clinical classification in relation to age, gender, parity, family history, BMI

	CEAP grade				
	C3 n=4 (%)	**C4a n=62 (%)**	**C4b n=11 (%)**	**C5 n=3 (%)**	**C6 n=20 (%)**
Age					
< 40	1(25)	12(19.4)	3(27.3)	2(66.7)	7(35)
40-60	1(25)	36(58)	6(54.5)	0	11(55)
>60	2(50)	14(22.6)	2(18.2)	1(33.3)	2(10)
Gender					
Male	0	58(70)	9(10.2)	3(3.4)	18(20.4)
Female	4(33.3)	4(33.3)	2(16.7)	0	2(16.7)
Obstetric score					
< 2 pregnancies	1(25)	0	0	0	0
≥ 2 pregnancies	3(75)	4(6.5)	2(18.2)	0	2(10)
Positive family history	0	17(27.4)	2(18.2)	2(66.7)	7(35)
BMI					
Normal	2(50)	29(46.8)	3(27.3)	0	5(25)
Overweight	2(50)	28(45.1)	4(36.4)	2(66.7)	11(55)
Moderately obese	0	5(8.1)	4(36.3)	1(33.3)	4(20)

The habit of smoking was present in 36% of the patients all of whom were males which included 30.6% of CEAP clinical grade C4a patients, 63.6% of grade C4b patients, 33.3% of grade C5 patients and 55% of grade C6 patients. A history of either trauma or previous surgery was reported in 14% of our patients.

Among the 88 males involved in the study, the Venous Doppler ultrasonography done in CEAP clinical grade C4a patients showed reflux in saphenofemoral junction (SFJ) and great saphenous vein (GSV) in 17.7% and 29% patients respectively, 72.7% and 81.8% of grade C4b patients had reflux in SFJ and GSV respectively, all patients of grade C5 had reflux in SFJ and GSV while 33.3% had reflux in saphenopopliteal junction (SPJ). Among the 18 males of grade C6, 90%, 95% and 40% had reflux in SFJ, GSV and SPJ respectively.(*p<.001)*

Among the 12 females enrolled in the study, 25% and 75% of females of CEAP clinical grade C3 showed reflux in SFJ and GSV respectively, 3.2% of grade C4a had reflux in SFJ and GSV, 18.2% and 9.1% of grade C4b had reflux in SFJ and GSV respectively while 10% patients of grade C6 had reflux in SFJ and GSV with 5% showing reflux in SPJ according to Venous Doppler scan. The *p* values for SFJ, GSV, SPJ are *<0.05, =0.12* and *=0.14* respectively (Table 3).

When all 100 patients are considered together, the *p* value for correlation between clinical findings and Doppler scan findings is *<0.001*.

Table 3. Prevalence of Venous Reflux in relation to CEAP Clinical Classification

Presence of reflux	C3 n=4	C4a n=62	C4b n=11	C5 n=3	C6 n=20	χ^2	*P*
SFJ							
Male	0(0)	11(17.7)	8(72.7)	3(100)	18(90)	34.4	< .001
Female	1(25)	2(3.2)	2(18.2)	0(0)	2(10)	8.91	< .05
GSV							
Male	0(0)	18(29)	9(81.8)	3(100)	19(95)	26.8	< .001
Female	2(50)	2(3.2)	1(9.1)	0(0)	2(10)	5.82	=0.12
SPJ							
Male	0(0)	0(0)	0(0)	1(33.3)	8(40)	19.6	<.001
Female	0(0)	0(0)	0(0)	0(0)	1(5)	5.45	=0.14

Discussion

The mean age of our study population was 48.5 years with majority belonging to the age group of 40-49 years and males outnumbered females in the study by a ratio of 7.3:1.Scott et al.[8] had observed a 6% increase in risk of CVI per 1 year increase in age. Similarly Fowkes et al.[4] had also observed a significant trend of increased prevalence of CVI with increasing age with the trend being more apparent in men compared with women.

The pattern of symptoms in our study is similar to that reported in the studies conducted by B Akbulut et al. in western Turkey[9] and A F A Khan et al. in Pakistan[10] 91.7% of the 12 females included in the study were multipara and the severity of varicosities was found to be more as the parity increased. Dindelli et al.[11] reported in a study of risk factors for varicose veins in women during pregnancy that increasing number of full term pregnancies, increasing age and a positive family history were significant risk factors. In the Tampere study,[12] prevalence of varicose veins in females with 0,1,2,3 and 4 pregnancies were 32%, 38%, 43%, 48%, and 59% respectively.

Majority of the patients in our study were engaged in professions which required prolonged standing. Abramson et al.,[13] in his community based study in Jerusalem found prevalence of varicose veins higher among subjects with protracted orthostasis. Gourgou et al.[14] reported that CVI cases were more likely to report prolonged standing compared with controls.

29.5% of the 88 males and 16.7% of the 12 females in our study gave a family history of varicose veins. In the studies by Fiebig et al[15] and Cornu Thenard et al,[16] heredity was found to play a prominent role in chronic venous disease development.

We observed in our study that an increased BMI is correlated positively with severity of disease more in women compared to men. Gourgou et al.[14] had observed in their study a two fold increase in likelihood of developing CVI among obese subjects. A similar observation was also made by Scott et al.[8]

The habit of smoking was reported by 36% of our patients all being males. Gourgou et al.[14] in his case-control study and Criqui et al.[17] in the San Diego Population Study observed that smoking and severity of CVD are associated. Trauma or previous surgery was reported by 14% of our patients. Scott et al.[8] and Jawien et al.[18] in their studies had mentioned previous leg injury as a possible risk factor for development of CVI.

Amongst the 100 patients in our study, telangiectasia was found more prevalent among women compared to men. All 4 cases of CEAP Clinical grade C3 were females. One among them belonged to age group <40 years and the remaining were above 40. The feature common to all these patients was the presence of bilateral pitting type of pedal edema along with telangiectasia /reticular veins. A similar observation had been made in the study by Chiesa et al.[19] In our study, 62% presented with pigmentation/eczema (CEAP clinical grade C4a) which included 58(70%) men and 4(33.3%) women (Fig 1). Amongst these, 27(43.5%) had features of both pigmentation and eczema while 35(56.5%) had only hyperpigmentation. Pedal edema was also an associated finding in 35(56.5%) patients. 10(16.1%) patients showed ankle flares (Fig 2). 10(16.1%) patients had associated xerosis while 7(11.3%) had atrophic skin changes mostly induced by steroids. Pigmented purpuric Dermatoses (PPD) was a finding in 7(11.3%) patients. Amongst the 11 patients classified as CEAP clinical grade C4b, we had 9(10.2%) men and 2(16.7%) women. All the 11 patients had LDS (Fig 3a) and 1 (9.1%) patient had associated atrophie blanche (Fig 3b).Trophic skin changes were present in 9(81.8%) patients. Ankle flares were present in two out of the eleven C4b patients. Three (3.4%) of our patients had healed venous ulcers (CEAP clinical grade C5) over their legs (Fig 4). All of them were males of which two had associated eczematous skin changes and one had LDS. In the study, 20 patients had active ulcers (CEAP clinical grade C6) of which 18 (20.4%) were men and 2(16.7%) were women (Fig 5). The associated findings were atrophie blanche in 1(5%) patient, healed venous ulcers in 2(10%) patients, LDS in 11(55%) patients, trophic skin changes in 11(55%) patients and xerosis amongst 6(30%) of them.


Fig. 1: a) Pigmentation b) eczema

Fig. 2: Ankle flares

Fig. 3b: Atrophie blanche

Fig. 3a: Lipodermatosclerosis

Fig. 4: Healed venous ulcer

Fig. 5: Active venous ulcer

Kurosh Parsi in his review article[2] has mentioned edema, corona phlebectatica paraplantaris (ankle flare), stasis dermatitis, pigmentary changes, atrophie blanche, LDS, and skin ulceration as the common cutaneous manifestations of CVI, while PPD, pseudo Kaposi Sarcoma are seen less commonly.

Correlation between clinical signs and Venous Doppler Scan findings: Among the 88 males in our study, the Venous Doppler scan performed in CEAP clinical grade C4a patients showed reflux in SFJ and GSV in 17.7% and 29% patients respectively, 72.7% and 81.8% of grade C4b patients had reflux in SFJ and GSV respectively, all patients of grade C5 had reflux in SFJ and GSV and 33.3% had reflux in SPJ. Among the 18 males of grade C6, 90%, 95% and 40% had reflux in SFJ, GSV and SPJ respectively.(*p<.001)*

Among the 12 females enrolled in the study, 25% and 75% of females of CEAP grade C3 showed reflux in SFJ and GSV respectively, 3.2% of grade C4a had reflux in SFJ and GSV, 18.2% and 9.1% of grade C4b had reflux in SFJ and GSV respectively while 10% of grade C6 had reflux in SFJ and GSV with 5% having reflux in SPJ according to Doppler scan. The *p* values for correlation between clinical severity and reflux in SFJ, GSV, SPJ are *<0.05, =0.12* and *=0.14* respectively.

When all 100 patients are considered together, the *p* value for correlation between clinical findings and Doppler scan findings is <.001.

The above findings reflect a strong correlation between severity of clinical signs and Doppler scan findings in males while in females, due to the small sample size, a correlation could not be established. Labropaulos et al. in his study[20] had observed a strong association between extent of venous reflux and clinical severity of CVI.

Conclusion

CVI, as a chronic medical disorder, has to be timely addressed and managed with a multidisciplinary approach which can, in the long run, help alleviate the physical, emotional and financial burden of each suffering individual. Population based studies in India with regards to CVI is a need of the hour. Studies with a larger sample size are required to gauge the severity of the problem.

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