"EFFECT OF SURGERY ON VENOUS SEVERITY SCORING SYSTEM IN VARICOSE VEINS"

1. DR. VURITI MRUDULA KUMARI, MS, MCH PEDIATRIC SURGERY ASSISTANT PROFESSOR OF SURGERY, GGH, ANANTHAPUR, AP, INDIA, MRUDULAVURITI@GMAIL.COM, 8903181659
2. DR. K. V. MADHUSUDHAN, MS, ASSISTANT PROFESSOR OF SURGERY, KMC, KURNOOL, AP, INDIA MADHUJWALA@GMAIL.COM, 9493344388
3. DR. B. UJJANESWARI, MS, ASSISTANT PROFESSOR OF SURGERY, GGH, ANANTHAPUR, AP, INDIA, DRUJJINESWARI@GMAIL.COM, 7032937603
4. DR. K. LOKESH., MS ASSISTANT PROFESSOR OF SURGERY, GGH, KADAPA, AP, INDIA, DRLOKESH04@GMAIL.COM, 9440286146
5. DR. J. SANDEEP, MS, SENIOR RESIDENT, APOLO HOSPITALS, BANGALORE, KARNATAKA, INDIA, JAKKADEEPU@GMAIL.COM, 9901235945

CORRESPONDING AUTHOR ADDRESS: DR. K. LOKESH., MS, ASSISTANT PROFESSOR OF SURGERY, GGH, KADAPA, AP, INDIA, DRLOKESH04@GMAIL.COM, 9440286146, HIG 25, SECOND LINE, STM, NEAR RIMS, PUTLAMPALLI, KADAPA, 516002

ABSTRACT:

Introduction: The Venous Clinical Severity Score (VCSS) was designed to give more strength to CEAP classification and to provide a method for serial assessment particularly to CEAP clinical class 4 and class 6. Even though the VCSS has been very useful, several areas of deficiency are also noted over time. VCSS was again revised by American Venous Forum with an intention to improve the VCSS, and also by preserving its strengths**. Aim of the Study**: To Compare VSS system with CEAP system postoperatively in assessing the outcome of varicose veins surgery. **Methodology:** A Prospective Longitudinal Clinical Study done in 30 patients from November 2019 to June 2021in the Department of General Surgery, Narayana Medical College and Hospital, Nellore. Duplex ultrasound for each patient to assess the following CEAP clinical class, CEAP 18-point clinical score, VCSS, VDS. Patients were followed up in the post-operative period for 6 weeks and 6 months and CEAP class, CEAP score, VCSS score and VDS will be recorded to assess the venous outcome at 6 weeks, 6 months**. Results & Conclusion**: CEAP score and VCSS

percentage reductions at 6 weeks and 6 months follow-up were almost similar, VCSS showed slightly higher reduction compared to CEAP score, implying almost equally good sensitivity in measuring outcomes compared to CEAP clinical class. Venous Disability Score (VDS) reduced to 100% by 6 months follow-up and found superior compared to other scores. Thus, reflecting that VCSS along with CEAP class has more use in determining overall severity of venous disease and its outcomes post-surgical intervention, when compared to other venous assessment tools.

KEYWORDS: Varicose veins, Venous Clinical Severity Score, Venous Disease Score, CEAP score

INTRODUCTION

"Permanent loss of venous valves lead to venous insufficiency and venous hypertension in standing position resulting in permanently dilated, tortuous and thickened vein known as Varicose Veins."(1) Subcutaneous dilated veins ≥ 3 mm in diameter measured in the upright position involving saphenous veins or saphenous tributaries or non-saphenous superficial leg veins. Varicose veins are often tortuous, however tubular saphenous veins with reflux can also be called varicose veins. (2) Primary varicose veins are most common type and accounts for majority of the cases resulting due to an idiopathic condition. Secondary venous insufficiency is produced by a deep venous thrombus or a main chronic obstructive disease and results from a post-thrombotic or obstructive condition.

The morbidity of CVD is causing more awareness now a days. So, a need has come for outcomes assessment tools which require reflecting the morbidity and response to treatment over time. The outcomes assessment tools should measure the change in status of the disease following treatment in a useful and objective fashion and should be a quantitative one rather than qualitative one. It should be applied to patients of different groups with varying levels of severity of the

disease. Many of these outcome tools were tried strengths and weaknesses. CEAP was one among them. It was based on venous pathology, clinical manifestations, and natural history of CVD. It was introduced in 1996, revised in 2004 and was revised again in 2020.

The American Venous Forum committee on outcomes assessment has developed the Venous Severity Scoring System in 2000 for disease severity measurement. Which has three components in its scoring system, the Venous Segmental Disease Score, Venous Disability Score, and the Venous Clinical Severity Score (VCSS). The Venous clinical severity score was developed from various elements of CEAP classification. The Venous Clinical Severity Score (VCSS) was designed to give more strength to CEAP classification and to provide a method for serial assessment particularly to CEAP clinical class 4 and class 6. Even though the VCSS has been very useful, several areas of deficiency are also noted over time. VCSS was again revised by American Venous Forum with an intention to improve the VCSS, and also by preserving its strengths.

Current topic chosen to study idiopathic varicose veins in terms of presenting symptoms, CEAP grading and VSS system grading during admission and to assess the outcome effectiveness of surgery in terms of patient condition by using VSS system in the follow-up period.

AIM OF THE STUDY

To study:

1. Presenting symptoms, CEAP grading,Venous Severity Scoring system at admission time for Primary Varicose Veins.

2. To Compare VSS system with CEAP system postoperatively in assessing the outcome of varicose veins surgery (Trendelenburg procedure and stripping of GSV along with perforator ligation).

Table No 1: Revised CEAP

C class	**Description**
C0	No visible or palpable signs of venous disease
C1	Telangiectasias or Reticular veins
C2	Varicose veins
C2r	Recurrent varicose veins
C3	Edema
C4	Changes in skin and subcutaneous tissue secondary to CVD
C4a	Pigmentation or eczema
C4b	Lipodermatosclerosis or atrophic blanche
C4c	Corona phlebectatica
C5	Healed ulcer
C6	Active ulcer
C6r	Recurrent active ulcer
E class	**Description**
Ep	Primary
Es	Secondary
Esi	Secondary intravenous
Ese	Secondary extra venous
Ec	Congenital
En	No cause identified
P class	**Description**
Pr	Reflux
Po	Obstruction
Pr,o	Reflux and Obstruction
Pn	No pathophysiology identified

A class	Description
As	Superficial veins
Ap	Perforator veins
Ad	Deep veins
An	Venous location not identified

Advanced CEAP: In basic CEAP, any of the 18 venous segments were identified

Superficial veins:

1. 1.Telangiectasis or reticular veins
2. 2.Great saphenous vein above the knee
3. 3.Great saphenous vein below knee
4. 4.Small saphenous vein
5. 5.Non-saphenous veins

Deep veins:

1. Inferior vena cava
2. Common iliac vein
3. Internal iliac vein
4. External iliac vein
5. Pelvic:gonadal, broad ligament veins, others
6. Common femoral vein
7. Deep femoral vein
8. Femoral vein
9. Popliteal vein
10. Crural: posterior tibial, peroneal veins anterior tibial (all paired).
11. Muscular: soleal veins, gastrocnemial, others

Perforating veins:

1. Thigh
2. Calf

CEAP Clinical Score

It is also included in the most recent version of the Handbook of Venous Disorders. It employs a 0 to 2 grading system for a variety of symptoms and indications, with a max of 18.

Table 2: CEAP clinical score

Attribute	Score		
	0	**1**	**2**
Pain	None	Moderate, not necessitating analgesics	Severe, necessitating analgesics
Edema	None	Mild or moderate	Severe
Venous claudication	None	Mild or moderate	Severe
Pigmentation	None	Localized	Extensive
Lipodermatosclerosis	None	Localized	Extensive
Ulcer diameter (cm)	None	<2	≥2
Ulcer duration (mo)	None	<3	≥3
Ulcer recurrence	None	Once	More than once

Few of the CEAP components are static, such as subcutaneous fibrosis and cutaneous atrophy, and are unlikely to alter after therapy. There is no adequate categorization of edema, and pain is not included at all, for which patient can be categorized into severe or mild disease, healed

ulcers are of no used in assessing treatment outcomes, numbers of venous ulcers will be different in every case and it cannot be used for diseaseseverity scoring assessment.

For all these drawbacks in CEAP, a new system of scoring was implemented to augment CEAP class but not replace CEAP.

Venous Severity Scoring

In 2000 The American Venous Forum created the Venous Severity Scoring (VSS) system in response to the demand for a disease severity evaluation. It was created based on the CEAP classification's traits and components. (3)

There is a significant need for outcome assessment measures that represent the morbidity and treatment responsiveness associated with chronic venous illness.

Venous clinical severity score— Venous disease is classified and significant clinical changes are evaluated using tools that rely on physician observation. (4) It is a modification of CEAP score because it is commonly used by clinicians and also because of its performance in the reporting criteria of the Society for Vascular Surgery and International Society for Cardiovascular Surgery(5), a 0 to 3 grading scheme has been used and applied it to all clinical descriptors. This allows measurement of progress or deterioration at each stage. Finally, 9 clinical descriptors were selected which are as below.

Attribute	*Absent = 0*	*Mild = 1*	*Moderate = 2*	*Severe = 3*
Pain	None	Occasional, not restricting activity or requiring analgesics	Daily, moderate activity limitation, occasional analgesics	Daily, severe limiting activities or requiring regular use of analgesics
Varicose veins[a]	None	Few, scattered: branch VVs	Multiple: GS varicose veins confined to calf or thigh	Extensive: Thigh *and* calf or GS *and* LS distribution
Venous edema[b]	None	Evening ankle edema only	Afternoon edema, above ankle	Morning edema above ankle and requiring activity change, elevation
Skin pigmentation[c]	None or focal, low intensity (tan)	Diffuse, but limited in area and old (brown)	Diffuse over most of gaiter distribution (lower 1/3) *or* recent pigmentation (purple)	Wider distribution (above lower 1/3) *and* recent pigmentation
Inflammation	None	Mild cellulitis, limited to marginal area around ulcer	Moderate cellulitis, involves most of gaiter area (lower 1/3)	Severe cellulitis (lower 1/3 and above) or significant venous eczema
Induration	None	Focal, circummalleolar (<5 cm)	Medial or lateral, less than lower third of leg	Entire lower third of leg or more
No. of active ulcers	0	1	2	> 2
Active ulceration, duration	None	<3 mo	>3 mo, <1 y	Not healed >1 y
Active ulcer, size[d]	None	<2-cm diameter	2- to 6-cm diameter	>6-cm diameter
Compressive therapy[e]	Not used or not compliant	Intermittent use of stockings	Wears elastic stockings most days	Full compliance: stockings + elevation

[a]"Varicose" veins must be >4-mm diameter to qualify so that differentiation is ensured between C1 and C2 venous pathology.
[b]Presumes venous origin by characteristics (eg, brawny [not pitting or spongy] edema), with significant effect of standing/limb elevation and/or other clinical evidence of venous etiology (ie, varicose veins, history of DVT). Edema must be regular finding (eg, daily occurrence). Occasional or mild edema does not qualify.
[c]Focal pigmentation over varicose veins does not qualify.
[d]Largest dimension/diameter of largest ulcer.
[e]Sliding scale to adjust for background differences in use of compression therapy.

Figure No 1: Original VCSS

Table No 3: Differences between CEAP clinical score and VCSS

CEAP clinical score	**VCSS**
Pain	Pain
	Varicose Veins
Edema	Venous edema
Venous claudication	
Pigmentation	Skin Pigmentation
Lipodermatosclerosis	Induration, Inflammation
Ulcer size	Ulcer size
Ulcer duration	Ulcer duration
Ulcer number	Ulcer number
Ulcer recurrence	
	Compressiontherapy
Maximum score, 18	**Maximum score, 30**

American Venous Forum made changes to the current VCSS to keep encouraging people to utilize VCSS and the revision is to improve the VCSS while not undermining current databases and ongoing trials. "Revision of the CEAP Classification for Chronic Venous Disorders: Consensus Statement" is an outstanding example of a well-accepted modification."(6) While the

core architecture of the instrument was retained, the clinical descriptions were changed to clarify the terminology and utilize globally understood vocabulary.

VCSS reflects severity changes in the wide variety of symptomatic venous disease and it also has the ability to reflect change in assessing response to therapy. VCSS has the capacity to comprehend a patient's statement of symptoms and match them to a VCSS category which is critical in obtaining correct data. The VCSS score is calculated by the clinician asking straightforward questions to the patient during evaluation.

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	None: 0	*Mild: 1*	*Moderate: 2*	*Severe: 3*
Pain or other discomfort (ie, aching, heaviness, fatigue, soreness, burning) Presumes venous origin		Occasional pain or other discomfort (ie, not restricting regular daily activities)	Daily pain or other discomfort (ie, interfering with but not preventing regular daily activities)	Daily pain or discomfort (ie, limits most regular daily activities)
Varicose veins "Varicose" veins must be ≥3 mm in diameter to qualify in the standing position.		Few: scattered (ie, isolated branch varicosities or clusters) Also includes corona phlebectatica (ankle flare)	Confined to calf or thigh	Involves calf and thigh
Venous edema Presumes venous origin		Limited to foot and ankle area	Extends above ankle but below knee	Extends to knee and above
Skin pigmentation Presumes venous origin Does not include focal pigmentation over varicose veins or pigmentation due to other chronic diseases	None or focal	Limited to perimalleolar area	Diffuse over lower third of calf	Wider distribution above lower third of calf
Inflammation More than just recent pigmentation (ie, erythema, cellulitis, venous eczema, dermatitis)		Limited to perimalleolar area	Diffuse over lower third of calf	Wider distribution above lower third of calf
Induration Presumes venous origin of secondary skin and subcutaneous changes (ie, chronic edema with fibrosis, hypodermitis). Includes white atrophy and lipodermatosclerosis		Limited to perimalleolar area	Diffuse over lower third of calf	Wider distribution above lower third of calf
Active ulcer number	0	1	2	≥3
Active ulcer duration (longest active)	N/A	<3 mo	>3 mo but <1 y	Not healed for >1 y
Active ulcer size (largest active)	N/A	Diameter <2 cm	Diameter 2-6 cm	Diameter >6 cm
Use of compression therapy	0 Not used	1 Intermittent use of stockings	2 Wears stockings most days	3 Full compliance: stockings

Figure No 2: Modified VCSS

Venous Disability Score (VDS)

The VDS, which is an CEAP extension, and it evaluates the impact of disease on occupational productivity. The VDS is whether the patient has ability to work eight-hours a day with or without assistance, and is rated on a scale of 0 - 3.

Table No 4: Venous Disability Score (VDS)

Disability score	Score
Asymptomatic	0
Symptomatic, can work without support	1
Work for 8 hrs but with supporting device	2
Not able to work even with device	3

Venous Segmental Disease Score (VSDS)

Using the CEAP system's anatomical and pathophysiological ordering, the Venous Segmental Complaint Score (VSDS) is generated based on venous influx or obstruction. Duplex Doppler or phlebography are used to dissect tone parts, furnishing the information demanded to calculate the VSDS.

The goal of the VSDS was to unite the morphological categorization of venous segments with the pathophysiologic designations of reflux and obstruction. The clinical score has to gather necessary information by duplex scanning. VSDS includes qualifying comments regarding its application.

Table No 5: Venus Segmental Disease Score (VSDS)

Segment involved	Score
Short saphenous	0.5
Long Saphenous	1

Thigh perforators	0.5
Calf perforators	1
Multiple calf veins	2
Popliteal vein	2
Superficial femoral vein	1
Profunda femoris vein	1
Common femoral vein and above	1
Total score	**10**

PATIENTS AND METHODS

TYPE OF STUDY: A Prospective Longitudinal Clinical Study

STUDY SAMPLE: 30 patients

STUDY DURATION: November 2019 to June 2021

PLACE OF STUDY: Department of General Surgery, Narayana Medical College and Hospital, Nellore

INCLUSION CRITERIA:

- Patients of both sexes, and above 18 years
- Patients with Primary Varicose Veins with SFJ incompetence and incompetent perforators, with or without complications

EXCLUSION CRITERIA

- Patients below 18 years
- Patients with secondary varicosities, Pregnancy, Lymphatic disease, Arterial insufficiency

METHODOLOGY:

Institute Ethical Committee clearance obtained for the study. Patients admitted to the General Surgery Department with Primary Varicose Veins formed the study subjects. Demographic data of the patients recorded in the proforma. After preliminary investigations as duplex ultrasound for SFJ, SPJ, perforator incompetence and to rule out DVT and confirmation of diagnosis for each patient to assess the following CEAP clinical class, CEAP 18-point clinical score, VCSS, VDS. VSDS for all patients has not been included in this study and has not been calculated. All the patients with SFJ incompetence and perforator incompetence underwent Trendelenburg procedure and stripping of GSV to below the knee and incompetent perforator ligation. Patients were followed up in the post-operative period for 6 weeks and 6 months and CEAP class, CEAP score, VCSS score and VDS will be recorded to assess the venous outcome at 6 weeks, 6 months.

Statistics: Microsoft Excel was used to construct a master chart using SPSS 22.0. Mean and percentages for different scores, t and p values are used to determine the significance of the difference noted between the scores and correlated in order to assess various outcomes. Paired t-test and individual t-test were used for correlation between the score and $p<0.05$ was considered as statistically significant.

OBSERVATION AND RESULTS

From present study done to evaluate VSS system in 30 patients treating around 42 limbs with varicose veins the results were as following

TABLE NO 6: AGE DISTRIBUTION

Age	Frequency	Percentage
20- 40	6	20%
41-60	19	63%
>60	5	17%
Total	**30**	**100%**

Of the 30 patients' maximum number of cases were between 41- 60 years19 (63%). 6 cases (20%) were between 20-40 years and 5 patients (17%) were above 60 years of age. The mean age of this study was 50 years.

TABLE NO 7: SEX DISTRIBUTION

Sex	No. of patients	Percentage
Male	21	70
Female	9	30
Total	30	100

TABLE NO 8: PREOPERATIVE SYMPTOMS

Symptom	Present	Percentage
Pain	21	50
Varicose veins	42	100
Edema	10	23.8
Pigmentation	21	50
Active Ulcer	14	33.3

Lipodermato sclerosis	21	50

TABLE NO 9: CEAP CLASS PRE-OPERATIVELY

C Score	No. of patients	Percentage
C6	14	33.3
C5	3	7.1
C4	11	26.1
C3	10	23.8
C2	4	9.5
C1	0	0

TABLE NO 10: CEAP PREOPERATIVE SCORE

CEAP Score	Count	Percentage
<7	14	33.3
8-10	23	54.8
>11	4	11.9

Among 30 patients with 42 limbs, mean CEAP score preoperatively was 8.57. majority of the patients were in between CEAP score of 8-10, 23 out of 42 limbs constituting of about54.8%, 5 limbs were above CEAP score 11 constituting of about 11.9% and 14 limbs were below CEAP score 7 constituting to 33.3%.

Venous Clinical Severity Scores of Patients Prior to Surgery

Out of 30 patients with 42 limbs, 16 patients (53.3%) were having preoperative VCSS score in between 10-15, no patients were below score 5 and 9 patients (30%) were having score above score 15. Mean VCSS was 12.83

Preoperative VDS

Out of 30 patients with 42 limbs,VDS score of 2, was seen in 17 cases (40.5%), 14 cases (33.3%)had VDS score of 0 and 11 cases (26.2%) patients have VDS score of 1 and mean VSD of 1.07

TABLE NO 11: PREOPERATIVE VDS

VDS SCORE	PATIENTS	PERCENTAGE
0	14	33.3
1	11	26.2
2	17	40.5
3	0	0

Correlation between preoperative scores (CEAP Class, CEAP score, VCSS score, VDS score):

Mean of CEAP Class was 4.31, 8.57 for CEAP score, 12.83 for VCSS score and 1.07 for VDS score. With increasing CEAP class particularly among C4-C6 classes all other scores i.e., CEAP score, VCSS score and VDS score were increasing linearly (r=0.809, r=0.894, r=0.963 respectively).

Table 12: Co-relation between Pre-operative CEAP- class, CEAP score, VCSS &VDS

PRE-OPERATIVE				
	CEAP CLASS	**CEAP-SCORE**	**VCSS**	**VDS**
Mean	4.31	8.57	12.83	1.07
SD	1.39	2.56	4.40	0.86
Median	4	9	14	1
Q1	3	6	8	0
Q3	6	9	15	2
Interquartile Q3-Q1	3	3	7	2

All p-values were <0.05, indicating a linear co-relation between the scores.

Follow-Up Symptoms:

TABLE No 13: FOLLOW-UP OF SYMPTOMS

Symptom	**Response at 6 Weeks**	**Response at 6 Months**

	Present	%	% reduction	Present	%	% reduction/ increase
Pain	10	23.8	52.3	0	0	100
Varicose veins	0	0	100	0	0	100
Edema	1	2.3	90	0	0	100
Pigmentation	21	50	0	21	50	0
Active Ulcer	14	33.3	0	0	0	100
Healed ulcer	0	0	0	13	31	+100
Lipodermatosclerosis	21	50	0	21	50	0

At 6 weeks, 11 patients' pain was reduced, Edema disappeared in 100% patients. Active ulcer has not disappeared in all the members and reduced in size in 6 members, and was same in 8 members. There was no change in pigmentation and lipodermatosclerosis. No patient had experience worsening of symptoms and complications.

At 6 months of follow-up after surgery 100 % disappearance of pain and edema was observed. Active ulcer disappeared in all members, reduced in size in 1 member and healed in 13 members. No change of pigmentation and lipodermatosclerosis at 6 months of follow-up.

TABLE NO 14: C-CLASS FOLLOW-UP

C CLASS	Follow up at 6 weeks	Follow up at 6 months
C0	4	14

C1	10	0
C2	0	0
C3	0	0
C4	14	15
C5	0	13
C6	14	0

At 6 weeks, all the patients in between C4-C6 remained in between C4-C6, i.e., 28 limbs (66.6%) in 6 weeks and 6 months follow-up period, with a follow-up mean of CEAP class at 6 weeks 3.57 and at 6 months 2.98.

Follow-up CEAP Score:

Out of 30 patients, mean CEAP score at 6 weeks follow-up was 3.60 with about 57.9% reduction and at 6 months follow-up 0.95, with about 88.9% reduction. At 6 weeks follow-up majority of the patients were in between CEAP score of 4-7 i.e., 25 limbs out of 42 constituting for about 59.5%.At 6 months follow-up majority of the patients were with CEAP score 0 i.e., 18 out of 42 limbs, constituting for about 42.9%.

Follow-up VCSS:

At 6 weeks follow-up, with a mean of 5.19, of about 59.5% reduction in mean. Majority of patients 22 out 42 limbs (53.3%) were having VCSS score in between 3-5, 16 (38.1%) had VCSS score between 6-8and 4 (9.5%) had VCSS score of 0-2. At 6 months follow-up with a mean of 0.90 of about 92.9% reduction in mean compared to preoperative mean. No patients were above VCSS score 3.

Follow-up VDS:

At 6 weeks follow-up, with a mean of 0.67, reduction was noted in about 37.3%. Majority of patients have VDS score of 1. At 6 weeks follow-up out of 30 patients with 42 limbs, with a mean of 0.00, reduction of about 100%. All the patients have VDS score of 0.

Correlation between scores (CEAP Class, CEAP score, VCSS score, VDS score) at 6 weeks and 6 months:

All the patients have been followed up at 6 weeks and 6 months postoperatively and scoring has been given, when co-related showed the following results and tabulated below.

CEAP class, CEAP score, VCSS and VDS all reduced statistically at 6 weeks and 6 months on comparing with pre-operative score values.

TABLE NO 15: CO-RELATION BETWEEN PREOP SCORE AND FOLLOW-UP SCORES

	PRE-OP				***FOLLLOW-UP – 1 (6 WEEKS)***				***FOLLOW-UP-2 (6 MONTHS)***			
	CEAP CLASS	**CEAP-SCORE**	**VCSS**	**VDS**	**CEAP** CLASS	**CEAPS CORE**	**VCSS**	**VDS**	**CEAP** CLASS	CEAP-SCORE	VCSS	VDS
MEAN	4.31	8.57	12.83	1.07	3.57	3.60	5.19	0.67	2.98	0.95	0.90	0.00
SD	1.39	2.56	4.40	0.86	2.19	1.40	2.41	0.47	2.14	0.90	1.06	0.00
MEDIAN	4	9	14	1	4	4	5	1	4	1	0.5	0
Q1	3	6	8	0	1	3	4	0	0	0	0	0
Q3	6	9	15	2	6	5	8	1	5	2	2	0
INTERQUARTILE Q3-Q1	3	3	7	2	5	2	4	1	5	2	2	0

At 6 weeks follow-up, CEAP class did not show much difference and all the patients in classes C4-C6 remained in the same class, thus signifying that CEAP class cannot evaluate postoperative outcomes. Significant co-relation was found between the scores CEAP score and VCSS and also with VDS (r=0.954, r=0.734 respectively) p-values <0.00001, indicating statistically significance.

VCSS was co-related with CEAP clinical class (r=0.645, p-value<0.00001) and VDS (r=0.684, p-value<0.00001) showing significant co-relation between the scores. At 6 months follow-up, according to CEAP class all the patients in between C4-C6 remained in between C4-C6, inferencing that CEAP class cannot evaluate postoperative outcomes.

CEAP score was co-related with VCSS at 6 months follow-up period (r=0.543, p-value=0.000203) showing statistical significance and also co-related with CEAP class (r=0.778, p-value<0.00001). Similarly VCSS was co-related with CEAP class (r=0.594, p-value=0.000034) and also co-related with CEAP score (r=0.543, p-value=0.000203).

Among the various scores conducted in our study, pre-operative and post-operative percentage changes has been calculated and has been used as sensitivity measurement tool for outcomes assessment. The percentage reduction in CEAP class was only 17.1% at 6 weeks follow-up and 30.8% at 6 months follow-up. Percentage reduction in CEAP score at 6 weeks is 57.9% and at 6 months 88.9%. Percentage changes in VCSS at 6 weeks is 59.5% and at 6 months 92.9%. Percentage changes in VDS at 6 weeks is 37% and at 6 months 100%.

Co-relation between Age and scores:

There was no significant co-relationship between age of the patient and CEAP class, score, VCSS and VDS.By using Spearman co-relation formula all p values are >0.05 and showed no statistical significance. (r_s = -0.11829, p (2-tailed) = 0.45561)

DISCUSSION

In the present study a prospective longitudinal study of 'Effect of Surgery on Venous Severity Scoring System in Varicose Veins' conducted in a study population of 30 patients with duplex scan confirmed varicose veins with SFJ incompetence in 42 limbs, admitted in Department of General Surgery, Narayana medical college and Hospital, Nellore.

Varicose veins management is on debate since ages.(7) High ligation (Trendelenburg) and stripping is considered to be the standard management, as it has highest rate of initial rate of success and lowest rate of recurrence.(8,9,10)

These patients after obtaining consent from the patients to be included in the study were assessed about presenting symptoms, pre-operative CEAP class, CEAP score, Venous clinical severity scoring, Venous Disability score pre-operatively. All the patients underwent Trendelenburg procedure, stripping of GSV below knee and perforator ligation. Patients were followed up at 6 weeks, 6 months post-operatively for symptom reduction, CEAP class, CEAP score, VCSS and VDS were calculated and co-related.

Age and Sex:

In our study we observed that the maximum cases about 21 (70%) were male and 9 (30%) were female. In a study reported by M.G.Vashist and Nitin singhal in Indian journal of surgery 2014(12) also reported that 70 patients out of 100 were males and 30 were females. Synbrandy et al have reported 31% males and 69% females. Tenbrook et al(13) have compared data from 20

studies and an overall average sex distribution was 51% females and 49% males. Burkitt et al(14)(India) showed a ratio of 1.5:1. compared to these observations. Leipnitz et al(15) in Germany recorded a ratio of 1:2. Widmer (16)in Switzerland recorded a ratio of 1:1. In a study done by S Chastanet et al. a total of 389 Lower Limbs operated for varicose veins included 311 patients of which 80 were male and 231 were female.(17)

In Widmer study (18) higher incidence in men (5.2%) than in women (3.2%), with the overall incidence of varicose veins being 4.2 %. The prevalence of venous disease increases with age.(19). However, there is no statistical significance between sex and the scoring systems according to Spearman's Rho score in this study (p-value>0.05). In this study we observed that most of the patients (56.66%) are in the age group of 40-50 years with mean age of 49.15years. In a study published in Indian journal of surgery 2014 observed that 58 of 100 patients were in the age group of 16-35 with a mean of 33.6 years. Patient's age and gender are known demographic factors related to venous disease.(20)

Symptoms:

Among 30 cases studied, pain is present in 21(50%), oedema in 10(23.8%) and ulcer was seen in 14 (33.33%),pigmentation was observed in 21(50%), 21(50%) patients had lipodermatosclerosis. Study by Goldman and associates in 1994 concluded that pain was common presenting symptom and attributed to pressure of the dilated vessels on a dense network of somatic nerve fibres present in subcutaneous tissues adjacent to affected vein.

Fig 3: Varicose veins

Fig 4: Varicose veins with edema

Fig 5: Varicose Veins with Pigmentation and Lipodermatosclerosis

Fig 6: Varicose veins with Chronic Venous ulcer

Fig 7: Intraoperative photo showing Tributaries of GSV and Flush ligation

CEAP Class:

In this study out of 30 patients with 42 varicose limbs, majority of patients were having preoperative clinical score C6 which is 14(33.3%)in number followed by C4 11 (26.1%)and C3 were 10 (23.8%)and C2 4(9.5%).Study by S Chastanet et al The CEAP clinical (C) classification was as Follows: 0 limbs were classed as C0; 2 as C1 (0.5%); 294 as C2 (75.6 %); 54 as C3 (13.9%) and 39 from C4 to C6 (10%).(17) But in my study C6 clinical classification were more.

CEAP score:

In our study patients were assessed with CEAP score and majority were in between 8-10, i.e., 23 (54.8%), <7 in 14 (33.3%) and 4 (11.9%) have score >11.The CEAP classification by providing a method for serial assessment over time and in response to an intervention.(3)

VCSS:

In our study the patients were assessed based on clinical severity score the mean of which pre-operatively was 12.83 and reduced to 5.19 after 6 weeks post-surgery (p value .00001). Gloviczki et al(21)USA reported "the results of north American SEPS registry(22) which included 146 cases from 17 centers across USA and Canada reported a clinical score improvement of 3.98 from 8.93 for a complete follow up period of 2 years".

The VCSS is evaluative and longitudinal, while the CEAP classification is a descriptive one and relatively static, especially in classes 4 through (3,4,23,24).Use of the current VCSS has proven valuable among patients with milder CEAP class 2 and class 3 disease in several studies.(25,26)

VSDS:

Post-thrombotic legs were not included in the study and hence VSDS has not been calculated in this study. This could explain the relatively weak association between anatomic and clinical factors, and supports previous hypotheses that venous ulceration is a multifactorial process.(27)

We found a linear association of both CEAP clinical score (r=0.665) and VCSS (r=0.508) with CEAP clinical class, which is a traditional indicator of venous disease severity. Similar median VCSS values and overall association of VCSS with CEAP clinical class have been reported by Meissner et al,(24) supporting the validity of these scores. These authors also reported excellent performance of VCSS in differentiating normal legs from those with venous disease, and legs with severe venous disease from those with moderate venous disease or normal legs.(24)

Follow-up symptoms:

Postoperative changes were mainly due to varicose vein removal and pain reduction. At 6 weeks postoperative follow-up period pain was present in 10 patients, with a percentage reduction of 52.3% and at 6 months pain was completely reduced in all the patients with a 100% reduction. Varicose veins at 6 weeks post-operative follow-up period completely reduced with a 100% reduction rate and no recurrence at 6 months follow-up period. At 6 weeks follow-up edema was present in 9 patients, with a percentage reduction of 90% and by 6 months follow-up edema reduced in all patients and no recurrence of edema in rest of the individuals with a 100% reduction rate. At 6 weeks and 6 months post-operative follow-up period pigmentation was has not reduced in any of the individual accounting to 0% reduction rate.

Active ulceration has not reduced in number at 6 weeks post-operative follow-up period, but the size of the ulcer has gradually reduced to about 30-40% in size. At 6 months post-operative follow-up period all the active ulcers have been healed and no patient developed new ulceration. Lipodermatosclerosis has not reduced both at 6 weeks and 6 months post-operative follow-up period accounting to 0% in reduction rate. No new individual developed lipodermatosclerosis till 6 months follow-up period.

CEAP-class follow-up

In our study Percentage reduction of CEAP clinical class at 6 weeks follow-up period was only 17.1% and at 6 months follow-up period 30.8%. All the patients in between C4-C6 remained in the same CEAP clinical class even after 6 months follow-up. Hence found that CEAP clinical class is non sensitive in measuring venous outcome, we still consider CEAP clinical class useful in classifying clinical stages. This was also the intention of the VSS inventors, to complement the current CEAP system.(31)

CEAP score and VCSS:

CEAP clinical score, reduced by 57.9% by 6 weeks follow-up period and to 88.9% by 6 months follow-up period and VCSS has reduced to 59.5% by 6 weeks follow-up period and 92.9% by 6 months follow-up period, demonstrated almost equally good sensitivity in measuring venous outcome Both VCSS and CEAP clinical score changes were significantly higher in comparison with those of CEAP clinical class, which is considered rather static

VDS

Venous Disability Score was reduced by 37% by 6 weeks follow-up period and a 100% reduction by 6 months follow-up period. VDS is simple and probably has a strong relation with quality of life.VDS changes were found to be superior to all other scores.

Reporting the CEAP clinical class in combination with the revised VCSS can add substantial clinical information. For example, CEAP clinical class 6 disease can only improve to class 5; class 4 disease may remain unchanged, despite diminishing signs and symptoms; the clinical status of patients with class 2 and class 3 level disease varies widely. Linking the VCSS to the clinical CEAP conveys a large amount of complementary information that enhances communication. Number of patients will develop recurrent disease after treatment.(28)The VCSS has a role in assessing these patients as well.

Padberg et al.in 2000 found VCSS would be the ideal tool (p value : 0.001) to measure the outcome risk assessment in varicose veins compared to CEAP which has already existed for many years, done in 2000 in a study conducted among 191 patients to find out which one was better outcome assessment after treatment for varicose veins among CEAP and VCSS. (14) Vasquez. et al done a study to assess the quality of life changes in varicose vein treatment in 499 patients by venous clinical severity score and found to be useful (p value; 0.002) to measure the changes in the varicose vein treatment.(23). Bradberg et al. and Munschauer CF. et al. investigated the use of the VCSS system in determining varicose vein risk and evaluating improvements following varicose vein surgery in 68 individuals and concluded that VCSS was beneficial (p value: 0.015). (4,29)

In 2006, Gilet. et al. conducted a research including 2894 patients to compare the characteristics of the VCSS and the CEAP in the treatment of varicose veins and found that the VCSS as a very good system (p value: 0.001) for the diagnosis and follow-up of chronic venous

insufficiency of the lower limbs.(14) Padberg.et al and Bradbury AW. et al conducted a study in 191 patients in 2000 to see which was better for assessing varicose vein clinical features and measuring changes after treatment for varicose vein between CEAP and VCSS and discovered that VCSS would be the ideal tool (p value: 0.001) for measuring the outcome and risk assessment in varicose vein compared to CEAP, which had been around for a long time. (3,30).

In 2006, Miami et al. conducted a research to evaluate the characteristics of the VCSS with the CEAP in the treatment of varicose veins, concluding that the VCSS was a very excellent method for diagnosing and monitoring chronic venous insufficiency of the lower limbs. (24). Nicholls et al. studied the usefulness of the VCSS system in assessing and evaluating improvements following varicose vein surgery and found VCSS to be beneficial. (31). Jessent V et al. investigated the clinical use of the VSS scoring system and found that while the VCSS and VDS components of the VSS were effective in clinical practise, the VSDS was not. (32). The three components of the new scoring system, VCSS, VDS, and VSDS, were verified by Stavros et al and demonstrated a strong connection with the anatomic degree of lower limb venous illness. He recommended that the new grading systems be used in clinical examinations to assess the outcome of varicose vein surgery.

CONCLUSION

In conclusion, various scoring systems are available in order to assess patients with varicose veins. CEAP clinical class previously considered as gold standard for evaluation and many of us still use clinical class in order to assess the patient may be still adequate for daily clinical purposes. But in order to assess the outcomes VCSS which is an adjuvant to CEAP score are helpful in assessing the venous outcomes post-surgery whether the patient is deteriorating or clinically improving which is evaluative and longitudinal compared to CEAP score which is static. The

revised VCSS together with clinical CEAP class provides a standard clinical language to report and compare different approaches to venous disease.

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