

## SPECTRUM OF CHRONIC VENOUS INSUFFICIENCY OF LOWER LIMBS- A KATURI PERSPECTIVE

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### ABSTRACT

#### BACKGROUND

Varicose veins is a very common disease in Guntur District with many patients having agricultural background. This study was conducted at Katuri Medical College and Hospital on 88 patients with a diagnosis of varicose veins for a period of 2 years from December 2013 to November 2015.

#### MATERIALS AND METHODS

All patients were subjected to clinical examination followed by duplex scan of the lower limbs. Patients were subjected to brief conservative treatment and were followed by Trendelenburg flush ligation with stripping and multiple stab avulsions. In this study, we found that males were commonly affected (68.18%) with agricultural background (42%). In 45% of patients, visible varicosities were present with clinical grading (C2) followed by active ulceration and lipodermatosclerosis (C6) in 40%.

#### RESULTS

Most common surgical procedure performed in majority of patients was Trendelenburg flush ligation with stripping and multiple stab avulsions. No major postoperative complications were observed with commonest minor postoperative complication being small haematoma in 3 cases. There are many treatment modalities for varicose veins with variable recurrences and complications. Trendelenburg flush ligation with stripping and multiple stab avulsions has stood the test of time even in this modern era.

#### CONCLUSION

This study was conducted at Katuri Medical College and Hospital, Guntur, on 88 patients with diagnosis of chronic venous insufficiency with wide spectrum of symptoms ranging from visible varicosities to venous ulcer with lipodermatosclerosis excluding deep venous thrombosis. This study focuses on the aetiological factors, various treatment modalities, their comparison, efficacy and causes of recurrence.

#### KEYWORDS

Varicose Veins, Ulcer, Lipodermatosclerosis, Duplex Scan, Venous Reflux, Trendelenburg Flush Ligation, Stripping, Multiple Stab Avulsions.

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#### BACKGROUND

Chronic venous insufficiency and its sequelae are a common problem that has a significant impact on afflicted individuals. It is often overlooked by the clinicians because of under appreciation of the magnitude and impact of the problem.

Unfortunately, the literature concerning the incidence and prevalence of chronic venous insufficiency has varied greatly because of differences in the methods of evaluation, criteria for definition and the geographic regions analysed. In Indian scenario, it is the complications, not the symptoms,

which bring the patients to the doctor. Lack of awareness and need for intervention are the reasons why they are under-reported.

This study evaluates the spectrum of CVI with regard to its clinical aspects, standard diagnostics and therapeutic options.

#### Aims and Objectives of the Study

1. To study the distribution and clinical features of chronic venous insufficiency of lower limbs.
2. To study the various modalities of investigations and overall management of chronic venous insufficiency of lower limbs.

#### MATERIALS AND METHODS

##### Patients

All patients admitted in male and female surgical wards of Katuri Medical College and Hospital, Guntur, who were diagnosed to have chronic venous insufficiency for a period of 2 years (December 2013-November 2015) n=88.

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**Method of Collection of Data**

All patients admitted to surgical wards as above will be considered as data source using clinical proforma. A thorough history was taken in all the patients. Detailed clinical examination was done and then subjected to duplex scan to confirm the diagnosis. Routine investigations were done and patients were offered conservative management. Patients who failed conservative measures previously were planned for surgery. The postoperative course was noted. Further, the patients were followed up.

It is a simple case study where the distribution, aetiological factors, mode of presentation, diagnostic modalities and the percentage of patients going for surgical intervention are studied.

All the information was taken down in the proforma designed for the study. Important data pertaining to each case is shown in the master chart.

**Inclusion Criteria**

- Patients presenting with dilated veins.
- Patients presenting with hyperpigmentation and itching.
- Patients presenting with active or healed venous ulcer.
- Patients presenting with previous history of deep vein thrombosis.

**Exclusion Criteria**

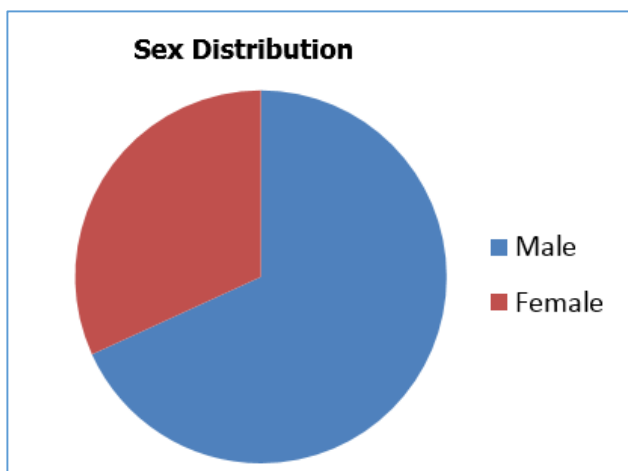
- Patients who were treated on outpatient basis.
- Patients who had undergone previous surgery.
- Patients with acute venous conditions like deep vein thrombosis.

**OBSERVATIONS AND RESULTS**

The most common age group of presentation is 51-60 years. The youngest case reported in the series being 23 years and the eldest being 80 years.

Chronic venous insufficiency was found to be more common in males. 68.18% of patients presented were males and 31.82% were females.

The male:female ratio is 2.14:1.

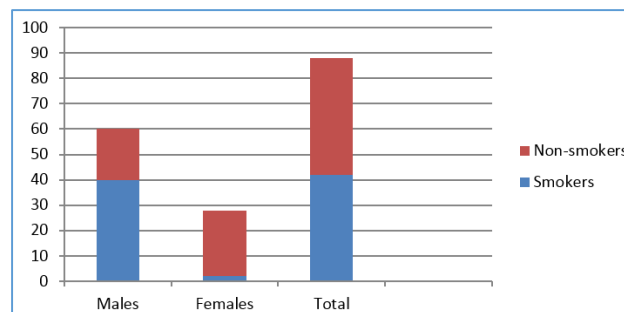


**Graph 1. Sex Distribution**

Most of the patients presented were agricultural labourers (42%), followed by manual labourers (28.4%) and housewives (19.3%).

**Association with Smoking**

47.73% of patients presenting with CVI are smokers. 66.66% of males presenting with the disease are smokers, whereas among females 7.14% are smokers.

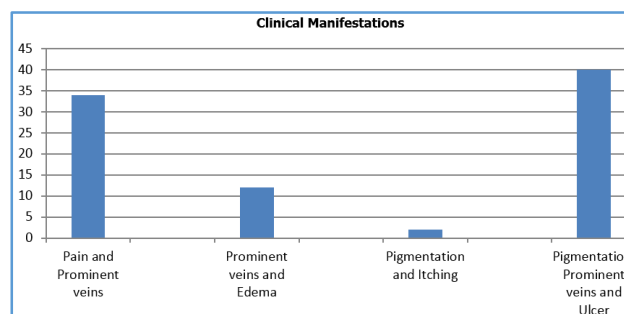


**Graph 2. Association with Smoking**

There is no significant difference pertaining to which limb is affected more. In this study, incidence in left limb is slightly higher than the right.

**Clinical Manifestations**

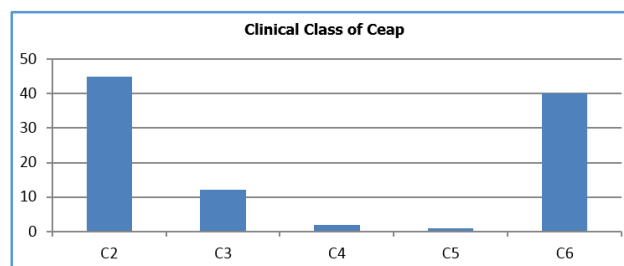
Most of the patients presented with symptoms of ulcers associated with either hyperpigmentation or dilated veins (45.45%) followed by symptoms of pain along prominent veins (38.6%). Among the studied cases, 4.54% gave a history of DVT in the past.



**Graph 3. Clinical Manifestations**

**Clinical Class of CEAP**

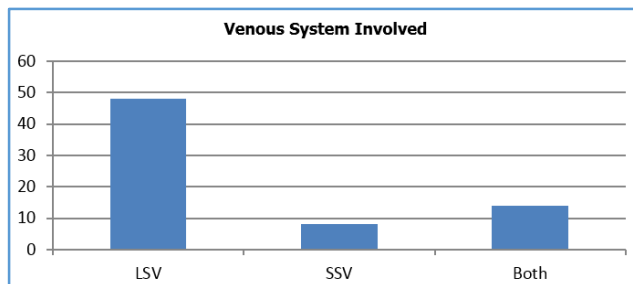
Majority of the cases studied were clinical class C2 (45%) followed by clinical class C6 (40%).



**Graph 4. Clinical Class of CEAP**

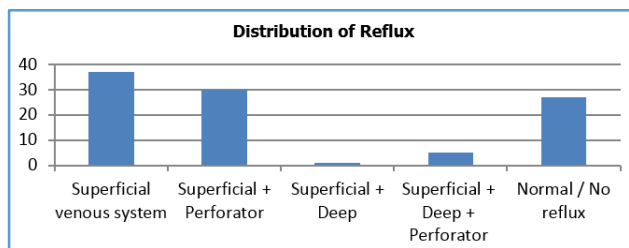
**Venous System Involved**

Among the cases presented with varicosities and ulcers, clinical examination revealed involvement of LSV alone in 48 limbs, whereas SSV involvement alone is seen in 8 limbs. Involvement of both veins are noted in 14 limbs.



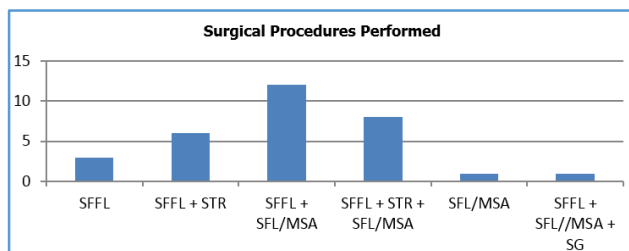
**Graph 5. Venous System Involved**

37% cases were found to have reflux in the superficial venous system alone, whereas 30% cases had reflux in superficial and perforator system, 5% had reflux in all three systems and 1% had reflux in combined superficial and deep systems. Isolated reflux in deep or perforator systems were not found in the present study.



**Graph 6. Distribution of Reflux**

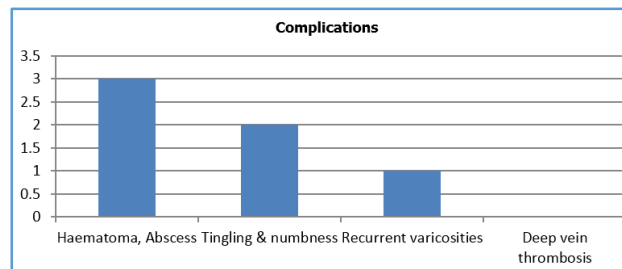
SFFL was done in almost all cases. It is combined with SFL/MSA in 38.7% of cases and additional stripping was done in 25.8% of cases. Only SFFL was done in 9.7% of cases and SFFL along with stripping was done in 19.4% of cases.



**Graph 7. Surgical Procedures Performed**

**COMPLICATIONS**

No major complications occurred in the perioperative period. Haematoma/abscess are seen in 3 cases (9.67%), tingling and numbness in 2 cases (6.45%) and recurrent varicosities were noted during follow up in 1 case (3.23%). No case of postoperative DVT noted. There are no perioperative deaths noted during the study.



**Graph 8. Complications**

**DISCUSSION**

**Age Distribution**

CVI was more common with increasing age. The Edinburgh Vein Study screened 1566 subjects with duplex ultrasound for reflux, finding CVI in 9.4% of men and 6.6% of women, after age adjustment, which rose significantly with age.<sup>1</sup>

In the present study, CVI was more frequent in the age group of 51-60 years affecting 28.4% of patients. The youngest case reported in the series being 23 years and the eldest being 80 years. The mean age of presentation was 48.8 years.

There was no significant sex difference pertaining to most common age of presentation and age distribution. In both males and females, the most common age of presentation is 51-60 years. The mean age of presentation in females was 49.3 years, whereas in males, it was 48.5 years.

**Sex Distribution**

CVI was predominantly seen in males. Although, most of the literature concerning to CVI reveals no much sex difference. The Edinburgh Vein Study demonstrated CVI in 9.4% of men and 6.6% of women, after age adjustment, which rose significantly to 21.2% in men above 50 years old and 12.0% in women above 50 years old.

In the present study, 28 patients (31.82%) were females and 60 patients (68.18%) were males with a sex ratio of 2.14:1 favouring men.

Sex distribution according to age was studied with no much difference in distribution.

**Occupation**

The recognised risk factors for lower limb insufficiency are family history, excess body mass index and prolonged standing. In this study, none of the patients had an established history of venous insufficiency running in the family. Prolonged standing has been associated with increased incidence of lower limb venous insufficiency. Most of the patients presented were agricultural labourers (42%), followed by manual labourers (28.4%) and housewives (19.3%).

**Association with Smoking**

No study has yet clearly established whether tobacco smoking is a risk factor of lower limb venous insufficiency other than Gourgou et al study.<sup>2</sup> The Framingham study reported an odds ratio of 1.7 for 10-19 cigarettes per day and an odds ratio of 2.4 for more than 20 cigarettes per day,

suggesting a significant association of lower limb venous insufficiency with tobacco smoking. In the present study, 47.73% of patients presented with CVI are smokers. 66.66% of males presenting with the disease are smokers, whereas among females 7.14% are smokers.

**Limb Involvement**

There is no significant difference pertaining to which limb is affected more. In this study, incidence in left limb is slightly higher than the right.

**Clinical Manifestations**

CVI represents a spectrum of conditions ranging from dilated veins, oedema, leg pain and cutaneous changes such as skin fibrosis and venous ulceration. The same clinical manifestations may result from the varied pathogenic mechanisms, i.e. incompetent valves alone, venous obstruction alone, muscle pump dysfunction alone or a combination. In this study, the spectrum of clinical manifestations were studied and the most frequent mode of presentation was ulceration along with either prominent veins or pigmentation or both (45.45%). Next, frequent mode of presentation was prominent veins along with either dull aching or cramping pain (38.63%).

Symptoms	Present Study		O Shaughnessy M et al <sup>3</sup> Percentage	Rudofsky G. Langenbecks Arch Chir <sup>4</sup> Percentage
	Number of Patients	Percentage		
Pain and prominent veins	34	38.63	54	30
Prominent veins and oedema	12	13.63	-	-
Pigmentation and itching	2	2.27	-	13
Pigmentation, prominent veins and ulcer	40	45.45	14	-
Previous history of DVT	4	4.54	5	-

**Table 1. Comparison of Clinical Manifestations**

O Shaughnessy M et al<sup>3</sup> reported that 54% of cases presented with pain and dilated veins, whereas Rudofsky G. Langenbecks Arch Chir study<sup>4</sup> reported 30% of cases presenting with such symptoms. In this study, 38.63% presented with those symptoms. Most common clinical presentation was however ulceration associated with hyperpigmentation or prominent veins or both (45.45%).

Among the studied cases, 4.54% gave a history of DVT in the past comparable to O Shaughnessy M et al who reported 5% occurrence.

All the patients presenting with venous insufficiency were categorised clinically based on CEAP classification. Clinical C1 includes telangiectasias and reticular veins are not included under chronic venous insufficiency. Clinical C2 includes dilated, tortuous veins, which are either symptomatic or asymptomatic. 45% of limbs in our study were categorised as C2.

**Clinical Class of CEAP**

Class of CEAP	Limbs	Percentage	Pramod Mirji et al <sup>5</sup> Percentage
C2	45	45	40.00
C3	12	12	28.57
C4	2	2	11.43
C5	1	1	2.86
C6	40	40	17.14

**Table 2. Comparison of Clinical Class of CEAP**



**Figure 2. Clinical manifestations of CVI. [A]Varicosities associated with edema – C3, [B]Hyperpigmentation in the gaiters area, [C]Prominent veins with hyperpigmentation –C4.**



**Figure 1. Clinical manifestations of CVI. Reticular veins – C1 [A], Varicose veins – C2 [B,C]**

Clinical class C3 includes varicosities, which are associated with localised oedema of the limb. 12% limbs in this study presented with varicose veins associated with oedema. Clinical class C4 includes skin changes like hyperpigmentation and lipodermatosclerosis. 2% of limbs presented with clinical features of hyperpigmentation or lipodermatosclerosis without ulceration.



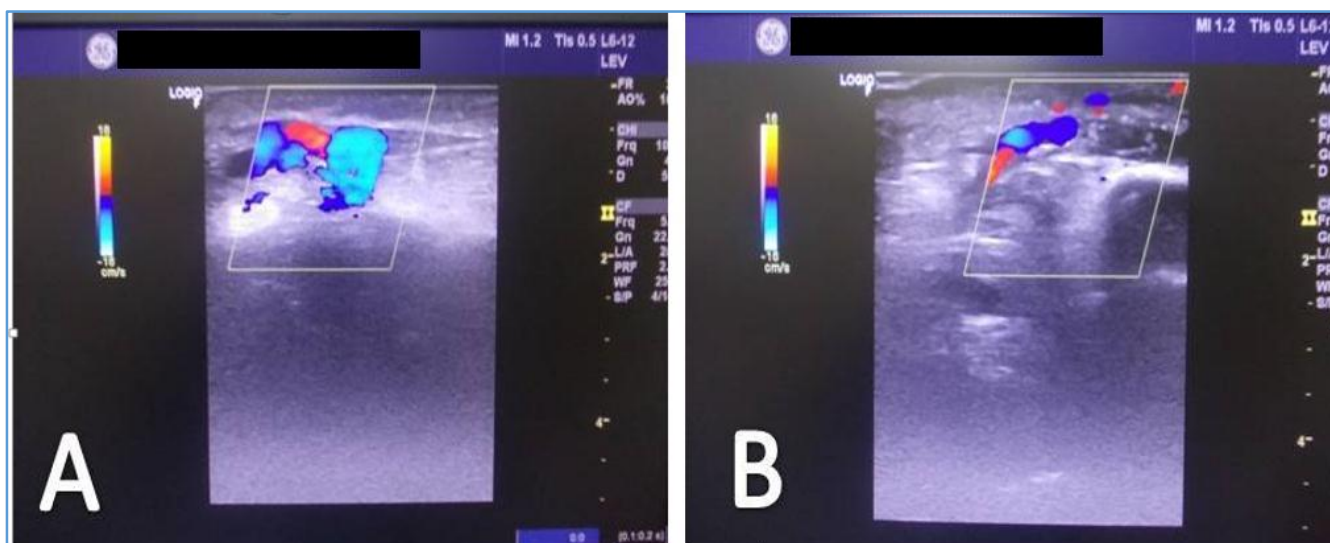
Clinical class C5 includes healed or inactive venous ulcers, whereas C6 includes active venous ulceration. In the present study, 40% of the limbs were diagnosed with active ulcers. All the limbs with oedema or skin changes were categorised under C6 if active ulcer is present.

**Venous System Involved**

In the present study, clinical examination revealed involvement of LSV alone in 48 cases (68.57%), which was comparable to Al-Mulhim et al study,<sup>6</sup> which reported involvement of LSV alone in 68.42% cases. Short saphenous vein involvement is seen in 8 limbs (11.42%), whereas 14 limbs (20%) showed involvement of both veins.

**Distribution of Reflux**

All the cases were subjected to Duplex ultrasonography to confirm the diagnosis. It is a well-established diagnostic modality to confirm the diagnosis of CVI and assess its aetiology and severity. Duplex scan evaluation revealed reflux in the superficial venous system alone in 37% of limbs. N Labropoulos et al<sup>7</sup> had studied the duplex scan findings in a large series, which revealed isolated superficial venous reflux in 31.3% of limbs. In the present study, 30% of limbs had reflux in superficial and perforator system, 5% had reflux in all the three systems, 1% had reflux in combined superficial and deep systems, isolated reflux in deep or perforator systems were not found in the present study.



**Figure 4. Duplex scan of venous system of lower limb.**

**[A] Reflux noted at Sapheno femoral junction. [B] Incompetent perforator.**

**Extent of Reflux in Superficial Venous System**

Extent of reflux was studied on duplex ultrasonography. Among 49 limbs showing reflux in the LSV on duplex scan, 21 limbs (28.8%) were found to have involvement both above and below knee. It was comparable with N Labropoulos et al study,<sup>7</sup> which reported an occurrence in 29.5%. 17 limbs (23.3%) showed reflux only below-knee and 11 limbs (15%) had reflux only in LSV above-the-knee. SSV involvement was seen in 10 limbs (13.7%) when compared to N Labropoulos study, which had 15.9%.

Involvement of SSV and LSV below-the-knee was seen in 8 limbs (11%) and involvement of SSV and LSV in both above and below knee was seen in 6 limbs (8.2%).

**Perforator Incompetence**

Involvement of perforators were noted on Duplex scan. Among the 100 limbs studied, 35 limbs showed incompetence of perforators. A total of 82 incompetent perforators were noted in 35 limbs, 64 incompetent perforators were below-the-knee and 18 incompetent perforators were above-the-knee. Maximum number of incompetent perforators identified in a limb were 4.

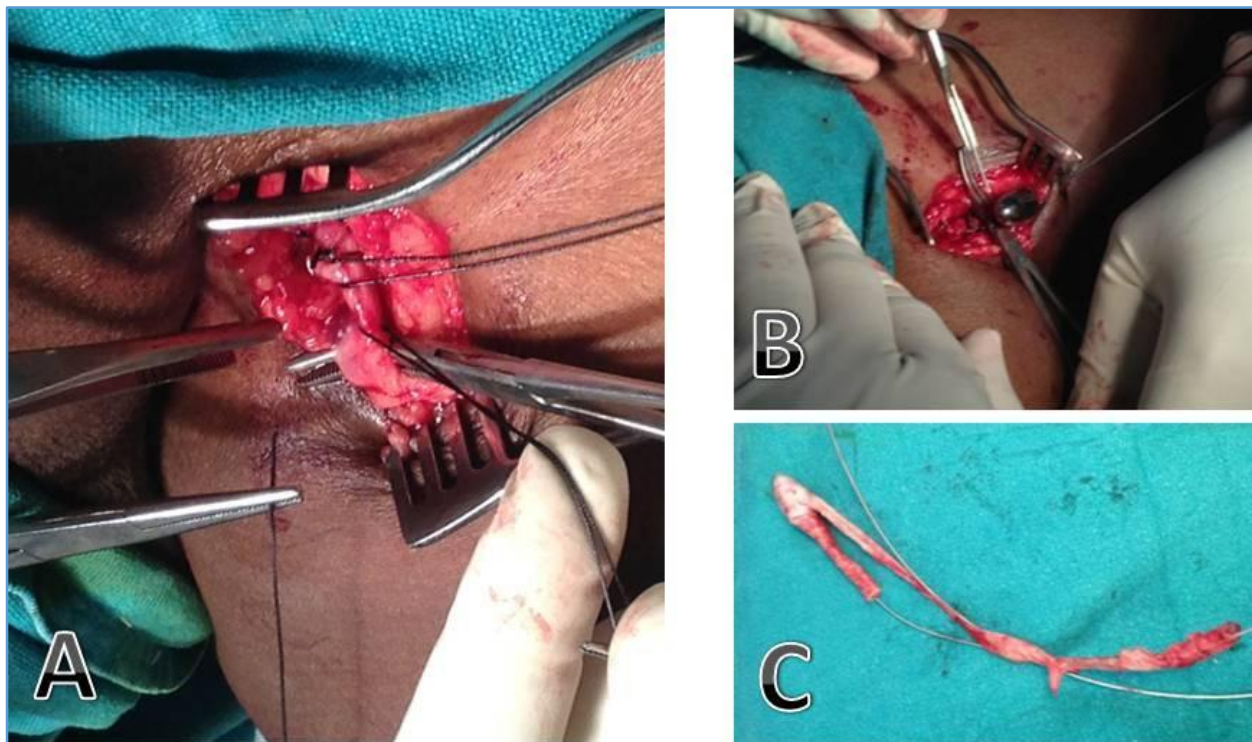
**Clinical Examination Vs. Duplex Scan**

Duplex scan finding revealed 73 limbs with significant reflux in the superficial venous system. 49 limbs showed reflux in the LSV alone and 10 limbs showed reflux in the SSV alone. 14 limbs showed reflux in both the veins.

These results were then compared with clinical examination findings. 48 limbs were found to have involvement of LSV alone on clinical examination, whereas 49 limbs showed reflux in the LSV on duplex scan. 8 limbs were found to have involvement of SSV alone on clinical

examination, but 10 limbs showed reflux in the SSV on duplex scan. Involvement of both LSV and SSV on clinical examination was noted in 14 limbs, similarly duplex scan revealed reflux in both the veins in 14 limbs.

**Surgical Procedures Performed**



**Figure 5. Surgical procedures performed. [A] Sapheno Femoral Flush Ligation(SFFL) being done. [B] Stripping(STR) being done. [C] Specimen of stripped LSV.**



**Figure 6. Surgical procedures performed. [A,B] Multiple stab avulsions(MSA) being done.**

**DISCUSSION**

The main stay of treatment of CVI involves conservative management to reduce the symptoms and to prevent the development of secondary complications and the progression of disease. Elevating the legs to minimise oedema and reducing intraabdominal pressure are advised. The use of compressive stockings was the mainstay of conservative treatment. If conservative measures fail or

provide an unsatisfactory response, then further treatment options were considered.

In the present study, conservative management was offered to most of the patients previously on an outpatient basis. Patients who failed conservative measures or unsatisfactory with the response were taken up for surgery. Patients who had high-grade reflux on duplex scan and those with significant varicosities who needed cosmetic benefit were also offered surgical treatment.

Among the 88 cases (100 limbs) studied, surgery was performed in 31 patients indicating that 31% of cases required surgery for the management of CVI.

Saphenofemoral Flush Ligation (SFFL) was done in almost all the cases. It is combined with Subfascial Ligation (SFL)/Multiple Stab Avulsion (MSA) in 38.7% of cases and additional stripping was done in 25.8% of cases. Only Saphenofemoral Flush Ligation (SFFL) was done in 9.7% of cases and Saphenofemoral Flush Ligation (SFFL) along with stripping was done in 19.4% of cases.

Saphenofemoral Flush Ligation (SFFL) with Subfascial Ligation (SFL)/Multiple Stab Avulsion (MSA) was the most commonly performed surgery in the present study (38.7%). Pramod Mirji et al study<sup>5</sup> yielded similar results in which 28.57% underwent Saphenofemoral Flush Ligation (SFFL) with Subfascial Ligation (SFL)/Multiple Stab Avulsion (MSA).

### COMPLICATIONS

In the present study, some minor complications occurred, which were managed conservatively. Haematoma / abscess are seen in 3 cases (9.67%) when compared to Critchley G et al study,<sup>8</sup> which reported an incidence of 2.8%. Tingling and numbness occurred in 2 cases (6.45%) similar to Critchley et al study, which had 6.6%. Recurrent varicosities were noted during follow up in 1 case (3.23%). No case of postoperative DVT noted in the present study. The study conducted by Hagmuller GW and Langenbeck<sup>9</sup> showed incidence of some major complications, which were very rare. None of those major complications occurred in the present study.

### FOLLOW-UP

All the patients were followed up on a regular basis. Only 1 patient had recurrent varicosities postoperatively, which was managed conservatively using compression stockings. 40 patients presenting with ulceration were managed conservatively or surgically. On follow-up, 2 cases presented with recurrence of ulcer.

### Conclusions and Summary

- CVI was more common with increasing age. The most common age group of presentation was 51-60 years.
- CVI was predominantly seen in males with a sex ratio of 2.14:1 favouring men.
- There was no significant sex difference pertaining to most common age of presentation. The mean age of presentation was 48.8 years. The mean age of presentation in females was 49.3 years, whereas in males, it was 48.5 years.
- Prolonged standing was associated with increased incidence of CVI. Most of the patients presented were agricultural and manual labourers and housewives.
- 47.73% of patients presented with CVI are smokers. 66.66% of males presenting with the disease are smokers, whereas among females, 7.14% are smokers.
- There is no significant difference pertaining to which limb is affected more.

- The most frequent mode of presentation was ulceration along with either prominent veins or pigmentation or both and the next frequent mode of presentation was prominent veins along with either dull aching or cramping pain.
- Majority of the cases were in clinical class C2 of CEAP followed by clinical C6.
- Clinical examination revealed involvement of LSV alone in 69%, whereas SSV involvement alone is seen in 11%. Involvement of both veins are noted in 20%.
- 37% of cases were found to have reflux in the superficial venous system alone, whereas 30% of cases had reflux in superficial and perforator system.
- 6% of cases showed reflux in the deep venous system associated with superficial and perforator reflux. 27% of cases had no reflux at all.
- A total of 82 incompetent perforators were noted in 35 limbs at an average of 2.34 incompetent perforators per limb.
- The main stay of treatment of CVI involves conservative management. Use of compressive stockings was the mainstay of conservative treatment.
- Patients who failed conservative measures or unsatisfactory with the response were taken up for surgery.
- Saphenofemoral Flush Ligation (SFFL) with Subfascial Ligation (SFL)/Multiple Stab Avulsion (MSA) was the most commonly performed surgery. Additional stripping was done in 25.8% of cases.
- Only Saphenofemoral Flush Ligation (SFFL) was done in 9.7% of cases and SFFL along with stripping was done in 19.4% of cases.
- No major complications occurred in the perioperative period. Haematoma/abscess are seen in 9.67%, tingling and numbness in 6.45% and recurrent varicosities were noted during follow up in 3.23% of cases.

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