# Management of varicose veins: Status of clinical examination and Colour Doppler in the present Indian scenario

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**Citation**

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**Abstract**

Varicose veins affect a significant percentage (40%) of the middle-aged population. It may not cause any mortality in the patients but causes a significant morbidity if left untreated. It is important to properly localize the problem before surgical management, to avoid recurrence of the disease. Clinical examination, if done alone for evaluation of patients of varicose veins, has a sensitivity of 90% for the saphenofemoral junction. But for perforator incompetence, it has a sensitivity of 61.5% only. There are likely chances that incompetent perforators are missed and may lead to recurrence of disease. Colour duplex ultrasound is an important non-invasive method for identification of superficial venous and perforator incompetence. It is especially valuable in detecting saphenopopliteal and perforator incompetence where accuracy of clinical examination is very low. It can help in localizing the perforators more precisely so that surgery can be performed by small incisions, especially at places where the facility for subfascial endoscopic surgery (SEPS) is not available. The authors recommend Color Doppler sonography in all patients of varicose veins before subjecting them to surgery as it is available in most of the district level centres in India.

## INTRODUCTION

Varicose veins are part of the penalty we pay for adoption of the erect posture. Varicose veins affect 10-20% of population in the western world but in developing countries, because of their way of life, the incidence is about 2%[1]. Various predisposing factors have been implicated like pregnancy, prolonged standing, obesity, old age, athletics etc., but heredity also plays an important role[2]. In varicose veins, the problem may lie in superficial veins, deep veins or in the perforating system. If the incompetent perforators are not properly localized and ligated they may complete the circuit of varicose veins draining blood from deep to superficial veins thereby leading to recurrence.

The aim of clinical examination is to localise the site of incompetence whether the superficial or deep system is affected and if the superficial system is involved whether the problem is at the saphenofemoral junction (SFJ), the saphenopopliteal junction (SPJ) or at the perforator level. Various tests are done for this purpose like Trendlenburg's test, Perthes' test, Fegan's test, Pratt's test and Schwartz's test etc. The overall accuracy of various clinical tests in localization of the exact site of incompetence is 60-70%[3].

The development of duplex ultrasonography (B-Mode), especially with bidiretional colour flow mapping, provides a simple, repeatable and non-invasive investigation for the study of the venous system. By this technique both anatomic and functional aspects of the three systems including perforators can be evaluated and exact location of valvular incompetence can be determined[4]. With accurate localisation of the incompetent sites, surgery can be done by small incisions resulting in better wound healing. So we carried out a study to compare the efficacy of clinical examination and colour duplex ultrasonography in detecting superficial venous and perforator incompetence in patients of varicose veins.

## MATERIAL & METHODS

The study was conducted on 50 patients of varicose veins admitted in surgical wards. A total of 64 limbs were studied in 50 patients. After thorough history, clinincal examination was done by various tests to see for saphenofemoral, saphenopopliteal and perforator incompetence. Colour duplex sonography was done in all patients with a high-resolution broad-band linear transducer of a frequency of 5-12 MHz, to localise incompetent valves in the superficial

system and incompetent perforators in the leg.

The patients were subjected to surgery after marking all the perforators with marking ink. Incompetent saphenofemoral and saphenopopliteal junctions were flush ligated and incompetence at these levels was confirmed at the time of surgery. The leg was explored by long subfascial incision through a medial access. All the medial perforating veins were identified, ligated and divided, and their distance from the sole of the foot was measured. Results of clinical examination and colour duplex untrasonography were compared with operative findings and analysed.

## RESULTS

The maximum number of patients was in the age group of 15-25 years, with the youngest patient being 18 years and male. Out of 50 patients, there were 32 males and 18 females. A total of 64 patient legs (46 legs in males and 18 in females) were evaluated in these 50 patients because of bilateral involvement in 14 patients. On clicincal examination, SFJ incompetence was found in 36 patient legs and Fegan's test indicated incompetent perforators at 104 sites which were marked. Perthes' test was negative in all patients indicating that deep veins were normal.

Colour duplex ultrasonography was done in all patients preoperatively. By colour Doppler, the patency of deep veins was assured in all patients. SFJ incompetence was detected in 40 patient legs, SPJ incompetence in 2 and incompetent perforators were marked at 100 sites. Intraoperatively, an incompetent SFJ was found in 40 patient legs and an incompetent SPJ in 2, while incompetent perforators were found at 104 sites.

## INTERPRETATION OF RESULTS

## SENSITIVITY AND SPECIFICITY OF CLINICAL EXAMINATION

Out of 40 incompetent SFJs, 36 were detected by clinical examination and 4 sites were missed (90% sensitivity) and all the 36 sites marked as incompetent SFJ on clinical examination were found to be incompetent on operative exploration (specificity 100 %). No SPJ incompetence could be detected by clinical examination. Out of 104 incompetent perforators found on operative exploration, only 64 could be detected by clinical examination (61.5% specificity) as shown in Table I.

**Figure 1**

Table 1

Sensitivity

| Level of incompetence | Total Number of Sites Marked on Clinical Examination | Correct Clinical Findings | Operative Findings | Percentage |
|---|---|---|---|---|
| Saphenofemoral | 36 | 36 | 40 | 90 |
| Saphenopopliteal | -- | -- | 2 | Nil |
| Perforators | 104 | 64 | 104 | 61.5 |

Specificity

| Level of Incompetence | Number of Marked sites | Operative Findings | Percentage |
|---|---|---|---|
| Saphenofemoral | 36 | 36 | 100 |
| Saphenopopliteal | Nil | Nil | 0 |
| Perforators | 104 | 64 | 61.5 |

## SENSITIVITY AND SPECIFICITY OF COLOUR DUPLEX ULTRASONOGRAPHY

The accuracy of colour duplex USG in detecting SFJ and SPJ incompetence was 100%, while 92 perforators could be detected out of 104 by this modality (88.4% sensitivity) and 12 sites were missed, which were situated mainly in the lower part of the leg. By colour duplex sonography, a total of 100 sites were marked as incompetent perforators, out of which 92 were found correct on exploration (92% specificity). So, for perforator incompetence, colour duplex USG missed detection of 12 perforator sites, and 8 sites were marked wrongly as false positive (Table II).

**Figure 2**

Table 2

Sensitivity

| Level of Incompetence | Total Number of Sites Marked on Duplex USG | Correct Duplex USG Findings | Operative Findings | Percentage |
|---|---|---|---|---|
| Saphenofemoral | 40 | 40 | 40 | 100 |
| Saphenopopliteal | 2 | 2 | 2 | 100 |
| Perforators | 100 | 92 | 104 | 88.4 |

Specificity

| Level of Incompetence | Total Number of Incompetence Sites Marked by Duplex USG | Operative Findings | Percentage |
|---|---|---|---|
| Saphenofemoral | 40 | 40 | 100 |
| Saphenopopliteal | 2 | 2 | 100 |
| Perforators | 100 | 92 | 92 |

## DISCUSSION

The majority of patients were in the age group of 20-35 years (68%), i.e. young adults. Age distribution in most studies varied from 30-40 years. In the present study, 64% were males and only 36%females. But according to the literature, women are affected twice more often than men[5].

This predominance of males in our study might be due to a male dominant society, with more males turning up for the treatment. The common clinical complaints were tiredness and aching sensations in the leg, ankle swelling and cosmetic appearance as reported in the literature. But a significant number of patients in our study were having symptoms of advanced disease like oedema (72%), pigmentation (36%) and ulceration (20%). This was probably because these patients neglected their disease in the early stage.

In the present study, the efficacy of clinical examination in detecting SFJ incompetence was high with a sensitivity and specificity of 90% and 100%, respectively. Chan et al. have reported it as 78% and 82% while Fegan reported it as 72% and 80%, respectively[6,7]. In the present study, SPJ incompetence was found in two patients on operative exploration, but none of them could be detected on clinical examination. A sensitivity rate of 60% has been reported for SPJ incompetence in other studies[7].

Causes of failure of detecting SPJ incomptence are inconstant position of the junction and T-shaped junction in some patients because of presence of a Giacomini vein. Regarding perforators, out of 104 sites marked clinically, perforators could be found only at 64 sites on operative exploration and at 40 sites there was no perforator. So sensitivity and specificity of clinical examination in detecting perforator incompetence was 61.5% (Table I). A study in literature has reported a sensitivity and specificity of 60% for clinical examination in detecting perforators[8]. This indicates that clinical examination alone is not sufficient for evaluation of patients of varicose veins.

In the present study, the SFJ was incompetent in 40 patient legs and all these were detected correctly by colour duplex USG. So sensitivity and specificity was 100%. The SPJ was incompetent in two patient legs and in both cases it was detected preoperatively by colour duplex USG, giving a sensitivity and specificity of 100%. But out of 104 perforators found on operation, colour duplex USG detected perforators at 92 sites, missing out 12 perforator sites, and 8 sites were wrongly marked. So the sensitivity of colour duplex USG for perforator incompetence was 88.4% and specificity was 92% (Table II). So it was much higher than that of clinical examination. Antoch et al. have reported a sensitivity and specificity of 80% and 74%, respectively, by colour duplex USG[3], while Hoare has reported it to be 79.2% and 100%, respectively[9].

So the results of the present study demonstrate that colour duplex USG is superior to clinical examination in evalution of superficial and perforator incompetence and it is especially valuable in detecting saphenopopliteal incompetence. By this we can exactly localise the perforators preoperatively and subfascial ligation can be done by small incisions which improves the wound healing in already compromised skin due to chronic venous insufficiency. So authors recommend that colour duplex USG should be done in all patients of varicose veins preoperatively, to improve the results of surgery and to avoid recurrence of the disease as the investigation is available in most of the district level centres. Surgery without proper evaluation of the disease is likely to give rise to recurrence of the disease.

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