

Original Research Article

A study to compare the usefulness of a careful clinical examination with venous Doppler studies in patients with varicose veins

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ABSTRACT

Background: The significance of recognizing and locating incompetent perforating veins for treating the patients with varicose vein and venous ulcers is well established. Several methods of diagnosing incompetent perforating veins have been evaluated in the past, however, none show satisfactory accuracy in predicting incompetent perforating veins. Clinical examination with digital palpation of fascial defects is the most widely used method. These fascial clefts are generally thought to keep up a correspondence to incompetent perforating veins. Further evidence is obtained when digital pressure relief on the defect leads to filling of superficial varicose veins or if a tourniquet applied beneath the defect prevents it. The purpose of the present study was to compare clinical examination with that of Doppler venous study in the diagnosis of incompetent perforating veins of lower limbs.

Methods: This is a Cross-sectional comparative study which was carried out in 34 (13 women, 21 men) patients with lower limb varicose veins admitted to the department of general surgery in Aarupadai Veedu medical college and hospital. 38 limbs were studied in 34 patients. They were evaluated by clinical tests and Doppler ultrasound.

Results: Saphenofemoral incompetence was correctly diagnosed in all the 38 limbs both by clinical test and Doppler ultrasound. In the evaluation of perforator competency, the sensitivity was 88.14% by clinical tests and 98.31% by Doppler ultrasound.

Conclusions: From this study and results, it shows that doppler ultrasound evaluation of the varicose veins should be done for accurate diagnosis in all patients before planning surgery.

Keywords: Doppler study, Varicose veins, Incompetent perforating veins

INTRODUCTION

The significance of recognizing and locating incompetent perforating veins in the treatment of patients with varicose veins and venous ulcers is well established.¹ Several methods of diagnosing incompetent perforating veins have been evaluated in the past. However, none show satisfactory accuracy in predicting incompetent perforating veins, it causes significant morbidity as recurrence is common if the site of incompetence is not properly localized or missed before surgical treatment.² Clinical examination with digital palpation of fascial defects is widely used. These fascial clefts are generally

thought to correspond to incompetent perforating veins. Additional evidence is obtained when digital pressure relief on the defect leads to filling of superficial varicose veins or if a tourniquet applied beneath the defect prevents it.¹ Recent reports advise that doppler venous study should be regarded as the "gold standard" in the diagnosis of incompetent perforating veins.^{3,4} It is the first method which allows a functional and anatomical assessment without being invasive. Doppler ultrasound is noninvasive, repeatable and involves no radiation.² Various tests, including both invasive and non-invasive have been studied, but simple clinical tests and Doppler ultrasound have been found to be more practical and

accurate in the diagnosis of incompetent venous systems. The purpose of our study was to compare clinical examination and doppler venous study in the diagnosis of incompetent perforating veins.

METHODS

In the present study, thirty-four patients with varicose veins admitted to the Department of General Surgery in Aarupadai Veedu Medical College and Hospital, Puducherry, from October 2017 to February 2018 were studied. Patients with dilated tortuous veins in the lower extremity and operated were included in the study, and excluded the patients who had deep vein thrombosis, superficial thrombophlebitis, and recurrent disease from the study.

A detailed history including the identification detail of the patient, presenting complaints, duration of illness is obtained. The patients were evaluated clinically using clinical examination (Brodie-Trendelenburg test I and II, multiple tourniquet tests, Schwartz test, Perthes test, Morrissey's cough impulse test, and Fegan's test.). Venous Doppler of affected lower limb was done.

Preoperatively, the competence of the saphenofemoral junction and the sites of incompetent perforators were marked independently by a clinician and a sonologist. Incompetent saphenofemoral incompetence (SFJ) was treated by flush ligation and incompetent perforators by

subfacial ligation by small transverse incisions. Intraoperatively, incompetency was confirmed by Turner-Warwicks bleed back sign.⁵

The result and comparison of clinical examination of incompetent perforators with doppler study were tabulated.

RESULTS

Study done between October 2017 and February 2018 of patients who were admitted in general surgery department of Aarupadai veedu medical college and hospital and underwent clinical examination, Doppler scan and surgery. 34 patients were included in this study. Out of 34 patients, 4 patients had involvement of both lower limbs; hence, 38 limbs were studied.

Out of 34 patients, 21 (62%) were male and 13 (38%) were female. Out of the 38 limbs studied, 21 (55.2%) were right lower limb and 17 (44.7%) were left lower limb.

Out of 38 limbs, in 29 limbs, SFJ was found to be incompetent by both clinical and Doppler evaluation and confirmed at surgery.

Hence, the sensitivity, specificity, PPV, and NPV were 100% both by clinical tests and Doppler ultrasound (Table 1).

Table 1: Incompetency of saphenofemoral Junction.

Saphenofemoral junction incompetency	Clinical test N (%)	Doppler N (%)	Intra-operative N (%)
Positive	29 (76.3)	29 (76.3)	29 (76.3)
Negative	9 (23.7)	9 (23.7)	9 (23.7)
Total	38 (100)	38 (100)	38 (100)

In these 38 lower limbs, clinical tests detected a total of 54 sites of perforator incompetency (including both above and below knee).

Table 2: Incompetency of perforators

Perforators	Clinical test positive	Doppler positive	Intra-operative positive
	54	62	58

Doppler evaluation revealed a total of 64 sites (including both above and below knee). Intraoperatively, 58 sites were confirmed (including both above and below knee) (Table 2). The accuracy of clinical tests in detecting perforators was sensitivity 88.14%, specificity 33.3%, PPV 96.3%, and NPV 12.5%, and the accuracy of

Doppler ultrasound was sensitivity 98.31%, specificity 20%, PPV 93.55%, and NPV 50% (Table 3). This showing that Doppler study in a patient of lower limb varicose veins reveals a higher and more accurate number and location of incompetent perforator veins than gathered from various clinical tests.

DISCUSSION

Varicose vein is a very common surgical problem and causes a great deal of morbidity.⁶ Accurate localization of incompetency is of paramount significance to avoid recurrence after surgery and to reduce morbidity. Although many clinical tests have been described and used, recent studies suggest that clinical methods are unreliable and Doppler ultrasound has great accuracy in identifying sites of reflux.^{7,8} Accuracy of clinical methods in detecting SFJ incompetence was compared with

intraoperative findings and the sensitivity and specificity were 100%. Similarly, Doppler ultrasound was 100% positive. In the study by Vashist et al., it has shown that in 64 limbs of fifty patients, the accuracy of clinical tests and Doppler ultrasound was 100%.⁹

Kim et al. observed that in 70 limbs of 44 patients, the Trendelenburg test had high sensitivity (0.91) but low specificity (0.15), and the handheld Doppler assessment at SFJ had high sensitivity (0.97) and specificity (0.73) of detecting reflux.¹⁰

Incompetent perforators are easy to overlook and difficult to diagnose certainly by any clinical test.¹¹ The lesser operations commonly practiced for perforators fail to detect (treat) incompetent perforators leading to recurrent varicosities and ulcers. The gold standard imaging (investigation) for detection of perforators is a contrast venography, which has several complications in addition to being invasive. On the other hand, Doppler ultrasound is noninvasive, repeatable and involves no radiation. Vashist et al. have shown that Doppler ultrasound is superior to clinical tests in detecting incompetent perforators. They found that out of 104 incompetent perforators confirmed at surgery, only 64 could be diagnosed by clinical tests (61.5% sensitivity) whereas Doppler ultrasound detected 92 correctly (sensitivity 88.4%).

In the present study, we demonstrate that the commonly used clinical tests are quite inaccurate in assessing the sites of reflux in patients with varicose veins. They are not accurate in localising sites of reflux from the deep to the superficial venous systems and, therefore, it would not be feasible to plan surgical procedures on the basis of the findings on clinical examination alone. The results of this study show that clinical diagnosis of incompetent perforating veins is inadequate. In this study, the sensitivity was 88.14% by clinical evaluation and 98.31% by Doppler ultrasound in the detection of perforator incompetence (Table 3). Irodi et al. have concluded that Doppler detection of incompetent perforators is the best noninvasive technique available to detect the number and distribution of the incompetent perforators.

Table 3: Sensitivity, specificity, PPV and NPV.

Parameters	Clinical test (%)	Doppler (%)
Sensitivity	88.14	98.31
Specificity	33.33	20
Positive Predictive Value	96.3	93.55
Negative Predictive Value	12.50	50

CONCLUSION

The conclusion of this study is that the clinical tests are inaccurate in assessing the perforator incompetence.

Hence, it is beneficial to do a preoperative Doppler ultrasound evaluation in all patients before surgery along with current practice of clinical tests for the best outcome of the surgery for the patient.

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