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ORIGINAL ARTICLE

A STUDY ON DIAMETER OF PERFORATORS AND CLINICAL SEVERITY OF CHRONIC VENOUS INSUFFICIENCY

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ABSTRACT: BACKGROUND: Perforator incompetence is an important part of assessment of chronic venous insufficiency (CVI), but the criteria for perforator incompetence and the relationship with clinical severity is not well established. **AIM:** To study whether measurement of diameter of perforator correlates with clinical severity of venous insufficiency. **MATERIALS AND METHODS:** One hundred and forty five consecutive patients (168 limbs) with varicose veins were evaluated with Doppler study of lower limb veins. Clinical severity and diameter of perforators were assessed. **RESULTS:** 23% of patients with clinically mild disease had perforator diameter of 3mm or more, whereas, 62% of moderate and severe disease patients had incompetent perforator. Average diameter of perforator in CVI class 1 & 2 patients was 1.44mm whereas, in class 3 & 4 patients, it was 3.31mm and 3.58mm in class 5 & 6 patients. **CONCLUSION:** Diameter of perforator compare favourably with clinical severity of chronic venous insufficiency. This study may help to evolve patient management guidelines in perforator incompetence treatment.

KEYWORDS: Varicose veins; Chronic venous Insufficiency; Perforator Incompetence; Perforator diameter.

INTRODUCTION: Chronic venous insufficiency is a major clinical problem, affecting about 15% of male and 25% of female population.(1) Disease can affect superficial and deep venous system. Superficial venous insufficiency involves axial reflux or perforator incompetence. Axial reflux can occur in saphenofemoral or short saphenopopliteal junction. Doppler study is needed for diagnosis as well as for therapeutic planning of varicose veins. Well documented criteria for evaluation of saphenofemoral and short saphenopopliteal reflux are available.(2,3) The criteria for perforator incompetence is less well established. The relationship of perforator incompetence to clinical severity of varicose veins is also less well documented.(4,5)

Many minimally invasive treatment options are available for axial reflux, including radiofrequency ablation and endovenous laser therapy.(6) The situation regarding treatment of perforators are less clear. Treatment options are also limited as most of the surgeons prefer the conventional ligation of perforators. Since this treatment is more invasive than minimally invasive treatment options for axial reflux, there is a dilemma whether perforator ligation should be done as concurrent or deferred procedure.(7) In an initial effort to provide a solution to this problem, we are evaluating whether diameter of perforator correlates with clinical severity, so that it can be considered as an additional criteria in decision making in treatment of incompetent perforators. Although perforator incompetence can be detected on Doppler study, it is not as easy to demonstrate as in saphenofemoral or shortsaphenopopliteal junction due to difficulty in eliciting Valsalva, and short length and oblique course of perforators, especially while penetrating deep fascia. Hence we are considering measurement of diameter of perforator as a reproducible and consistent method in evaluation of perforator incompetence. Very few studies are available which document the significance of diameter of perforators.

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MATERIALS AND METHODS: This is a retrospective analysis of prospectively collected data. One hundred and forty five consecutive patients (168 limbs) over a period of one year, who presented to surgery OPD in a tertiary care hospital in South India with symptoms suggestive of chronic venous insufficiency were evaluated with Doppler study of lower limb superficial and deep venous system and perforators. History was noted including previous surgery for varicose vein. Clinical examination was done and patients were assigned into CEAP classes,[8] as follows.

0. No visible changes in physical examination.
1. Telangiectasias, reticular veins, redness of the skin around the ankles.
2. Varicose veins.
3. Presence of oedema without skin changes.
4. Lesions dependant of venous diseases – discolouration, lipodermatosclerosis.
5. Skin changes described above with signs of healed venous ulcers.
6. Skin lesions such as in 1-4 plus active venous ulcers.

Doppler study was done in the standing position by colour and duplex Doppler using 12 MHz linear transducer (Voluson 730 Pro). After evaluation of the deep veins, saphenofemoral junction and short saphenopopliteal junction, perforators were examined. The number, site and diameter of perforators were noted. Perforators were traced from superficial to deep vein and the diameter was measured at the level where deep fascia was penetrated (Figure). Only perforators larger than 3mm in diameter was considered as incompetent or pathologic perforators.[9,10] Any perforator just proximal to an ulcer was specifically noted. Patients with history of varicose vein surgery and patients with deep venous thrombosis were excluded from the study.

Measuring diameter of perforator

RESULTS: There were a total of 145 patients (168 limbs). 73 patients (50.3%) were male and 72 female (49.7%). 78 patients (46%) were CVI class 1 & 2, 54 patients (32%) class 3 & 4 and 36 patients (22%) class 5 & 6. 74 patients (23%) had perforators with 3mm or more in diameter.

Perforator Diameter	CVI Class 1 & 2	CVI Class 3 & 4	CVI Class 5 & 6
3mm or more	18/78 (23%)	34/54 (63%)	22/36 (61%)
3.5mm or more	4/78 (5%)	18/54 (33%)	16/36 (44%)

STUDY RESULTS

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38 patients (23%) had perforators measuring 3.5mm or more. 18 out of 78 (23%) class 1 & 2 patients had incompetent perforators , whereas 34 (63%) of 54 class 3 & 4 patients and 22 (61%) out of 36 class 5 & 6 patients had incompetent perforators. When 3.5mm was taken as incompetent perforator, 4 out of 78 (5%) class 1 & 2 patients, 18 out of 54 (33%) class 3 & 4 patients and 16 out of 36 (44%) class 5 & 6 patients had incompetent perforators. (Table)

When clinical disease was classified as mild (class 1 & 2) and moderate to severe (class 3-6), it was found that 18 out of 74 patients (23%) with mild venous disease and 56(62%) out of 90 patients with moderate to severe disease (class 3-6) had incompetent perforators. When 3.5mm was considered as incompetent perforator, 4(5%) out of 78 mild disease patients and 34(38%) out of 90 moderate to severe patients had incompetent perforators.

Average diameter of perforator in CVI class 1 & 2 patients was 1.44mm, in class 3 & 4 patients 3.31mm and in class 5 & 6 patients 3.58 mm.

54 out of 78 (64%) class 1 & 2 patients had axial reflux (saphenofemoral or short saphenopopliteal reflux), whereas, 48 (89%) out of 54 class 3 & 4 patients and 32 (89%) out of 36 class 5 & 6 patients had axial reflux.

Two (8%) of the 24 class 1 & 2 patients without axial reflux had incompetent perforators, whereas, 2(33%) of 6 class 3 & 4 patients and all four (100%) class 5 & 6 patients without axial reflux had incompetent perforators.

DISCUSSION: Documentation of perforator incompetence during Doppler study for varicose veins has been a confusing entity. There are different views regarding what constitutes incompetent perforators and its clinical significance. Various practitioners describe perforator incompetence as mere presence of perforator vein, reflux during Valsalva or by measuring the diameter of perforator. We have studied the diameter of perforator and its clinical significance to find out whether incompetent perforators, as considered by diameter, has clinical significance. We have considered perforators measuring 3mm or more in diameter as incompetent perforator.

This study has demonstrated that considering perforators with diameter of 3mm or more correlated well with clinical disease. Only 23% of patients with mild disease had perforator 3mm or more in diameter, whereas, 62% of patients with moderate and severe disease had incompetent perforators. Average diameter of perforator was more in class 3-6 patients (3.45mm) when compared to class 1 & 2 patients (1.44mm).

CONCLUSION: The diameter of perforators compare favorably with clinical severity of chronic venous insufficiency. This study can have implications in management of perforator incompetence.[11] Combining clinical and Doppler evaluation can be an objective criterion and will help to evolve patient management guidelines in perforator incompetence.

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