



Radiodiagnosis

EFFICACY OF PREOPERATIVE MARKING OF INCOMPETENT PERFORATORS ON DOPPLER AND SURGICAL CORRELATION

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ABSTRACT

To evaluate the efficacy of Preoperative Marking of Incompetent Perforators on Doppler. A prospective study including 50 consecutive patients (70 lower limbs) who underwent surgery for varicose veins in between 2017-2018 were included for preoperative marking.

"T" technique is a technique of Doppler marking of an incompetent perforator long limb of the T representing the course of the superficial vein and the junction of the T representing the site of perforator entering the deep fascia. Surgical correlation was done. The overall surgical detection rate of incompetent perforators was 263 / 280(93.2%); .The "T" technique of Doppler marking was found to be easy to perform and aided intraoperative detection.

KEYWORDS : varicose veins, perforator, Doppler**INTRODUCTION**

Varicose veins cause a great deal of morbidity in our population¹. It is a very common problem affecting approximately 15% of men and 25% of women of general population in Western studies².

The objective in the surgical treatment of varicose veins is to ensure that all the sites of reflux from the deep to the superficial venous system, including incompetent perforators are ligated and divided to minimise the rate of recurrent varicosities³. The etiology of post operative recurrence is multifactorial, but two important areas that have been identified include the inaccuracy of the preoperative diagnosis of the sites of reflux, and the inadequacy of the subsequent surgery⁴. An international consensus meeting was convened to consider the topic of recurrent varicose veins after surgery (REVAS). The group met in Paris in July 1998, and was chaired by Michel Perrin and J. Jerome Guex. The consensus endorses the value of routine preoperative duplex scanning prior to the first operation for varicose veins⁵. Accurate diagnosis of the sites of reflux and appropriate ligation results in optimal functional outcome and reduces the chances of recurrence. The site of incompetent perforators is difficult to delineate clinically³. Based on these facts, there is a great need to have a more objective way of detecting incompetent perforators. Color and spectral Doppler is a valuable imaging tool before venous stripping and is capable of replacing invasive ascending and descending venography⁶. We have made an attempt to standardise the technique ("T") of perforator marking on ultrasound and correlate it with surgery.

Patients And Methods

A prospective cohort Study carried out in Departments of Radiology and Surgery between 2017-2108. During this period, all patients posted for Varicose vein surgery were included in the study. The day prior to surgery, all patients underwent repeat Doppler examination for perforator marking. The patients were made to stand with the limb of examination. Entire lower limb was checked with sonography, colour and spectral Doppler to look for the incompetent perforators in various locations, so that the detection was complete. Importance was given to the demonstrable reflux and continuity of the perforator with a dilated superficial vein. Perforators with diameter less than 2.5mm are considered as tiny perforators. Tortuously oriented were specially mentioned. The perforators were marked using the "T" technique (Fig. 1). The longer limb of the "T" indicates the course of the dilated superficial vein, which is continuous with the incompetent perforator. The junction of two limbs indicates the corresponding superficial point for the perforator entry into the deeper plane. The marking was done with a permanent marker after shaving the limb on the day before the surgery or on the day of the surgery. A reference map indicating the details was drawn. During surgery, a perpendicular incision was given across the longer limb of "T" so that the dilated tortuous superficial vein could be detected and traced to the perforator, which was ligated. A search for the possible extra perforators was made by tracing the

other tortuous superficial veins and palpable facial defects. Comparison of the number of perforators detected on Doppler study and on surgery was done as part of primary analysis of Doppler detection of perforators

**FIGURE :1****RESULTS**

50 consecutive cases (70 lower limbs) that underwent surgery for varicose veins in our hospital during the study period were included in this study. There were 40 men and 10 women with age group ranging from 30-60 years and an average of 45 years. 28 right lower limbs and 42 left lower limbs were studied. The distribution of perforators is given in Table 1. The commonest site for the incompetent perforators was the medial aspect of the leg followed by posterior and lateral aspects. Most of the incompetent perforators measured more than 2.5 mm in diameter; largest one found was 6 mm in diameter. The surgical detection rate of various perforators is shown in Table 2. Additional 17 perforators were found during the surgery, which were not identified as incompetent perforators on Doppler examination.

Table 1 : DISTRIBUTION OF PERFORATORS

Location	Number
Thigh	10
Leg -Anterior	4
Leg-Posterior	68
Leg- Medial	158
Leg- Lateral	40
Total	280

Table 2 : DETAILS OF PERFORATORS MARKED ON DOPPLER AND SURGICALLY DETECTED

Size of perforator	Surgically detected	Marked on doppler	Percentage
Less than 2.5mm	21	25	84.0%
More than 2.5mm	242	255	94.9%
	263	280	93.2%

DISCUSSION

The standard surgical techniques for incompetent perforator ligation like Linton's subfacial or Cockett's extrafacial techniques require extensive incisions and are based on the assumption that perforators follow a specific distribution. We found that though the perforator distribution is common in some sites, they are found in various locations and for a more satisfactory outcome Doppler detection is essential. We found that by detecting the perforators preoperatively, the incisions can be minimised to the exact site with probably better functional outcome. Doppler study of entire lower limb was performed in standing position. Other method of preoperative imaging for the detection of the perforators is a contrast venography, which is not routinely performed and has several disadvantages in addition to being invasive. The advantages of Doppler include non invasiveness, can be cross checked and repeatable, no use of ionising radiation, no occlusion of any perforator by tourniquet as in phlebography. We would also like to stress here the ability of Doppler examination to check the perforators under physiological distension (standing, non weight bearing). The sites of perforators are difficult to delineate clinically³. The objective is to ensure that all the perforators are ligated and divided to minimise the rate of recurrent varicosities [3]. Few additional perforators were ligated during the surgery and sizes of these perforators were noted down. Some of these could be the small (less than 2.5mm) visible perforators on Doppler without demonstrable reflux.

The comparison between the Doppler and surgical detection of perforators indicated that Doppler detection is a step towards the optimal care of the varicose veins patients. The long-term benefits can be assessed by assessing the rate of recurrence & comparing it to the rates when Doppler marking of perforators was not used. Recurrence of varicose veins is multifactorial and nonidentification of the perforators is one of the important determining factors. Doppler detection of incompetent perforators in patients of varicose vein disease is the best non invasive technique available to detect the number and distribution of the incompetent perforators. The main aims are to obtain a better surgical outcome, reduction in the recurrence and a cosmetically better result. We have made an attempt to evaluate efficacy of Doppler technique of perforator marking.

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