International Journal of Medical and Health Research
ISSN: 2454-9142, Impact Factor: RJIF 5.54
www.medicalsciencejournal.com
Volume 3; Issue 4; April 2017; Page No. 73-75

A doppler study of evaluation of varicose veins in South Indian patients

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Abstract
Introduction: The major cause of death in some cases is the varicose veins. This affects in 15% males and 25% females. The prevalence remains unknown in Indian population. Early diagnosis and treatment will save the complications due to varicose veins. The knowledge of specific case is necessary to provide appropriate treatment.
Aim: Is to observe the patterns of deep venous junctions, competency of perforators and their distribution and prevalence of deep venous reflux in Indian patients.
Methodology and results: The study was conducted in 100 patients over period of two years. The patients with varicose veins as a result of thrombophlebitis or venous thrombosis were excluded from this study. Examinations were conducted using Ultramark 9 machine having a MHz linear probe. Ultrasound scanning, color and spectral Doppler were used for the study. The surface of the lower limb was examined. Grading was done to assign the patients to the CEAP grades. 6 patients scored 0, 75 patients scored 1, 18 patients had a score of 2 while 1 patient had the score 3. The incompetence was assed using the Doppler analysis during the Valsalva maneuver.
Discussion: The chronic venous conditions will be caused by reflux. This is a retrograde flow of blood in veins which occurs due to incompetent or absent valves. This way, high pressure blood moves from deep veins into superficial veins causing various adverse effects such as pigmentation of the skin and ulceration. The Doppler test is considered to be the best standard for measuring the extent of the venous damage in a non-invasive yet functional manner.
Conclusion: patients with varicose veins have multiple site incompetence as the most common pattern of their disease. The Color Doppler is useful in identifying the extent of reflux in patients for a complete diagnosis and incompetence mapping. This study revealed high prevalence of varicose veins among Indian patients. In this study, 59 cases had involvement of left limbs and 41 cases in right limbs.

Keywords: varicose veins, incompetent veins, Doppler study, venous reflux.

Introduction
Varicose veins are a significant cause of death today. It is a problem that affects about 25% of women and 15% of men in the society today (Houghton, Panayiotopoulos, & Taylor, 1996). Nonetheless, the prevalence among Indian populations remains unknown. While different treatment methods have been developed for the treatment of varicose veins, knowledge of the specific patient is required to provide appropriate treatment. The CEAP grades are as follows: In Grade 0 there is no visible or palpable varicose veins, in Grade 1 there will be telangectasia where in the veins appear as thread like structures or spider like or broken veins. In Grade 2 varicose veins are without any symptoms. The grade 2 is further divided into 2A (asymptomatic), 2S (with symptoms). Grade 3 consists of varicose veins associated with swollen ankles. Grade 4 is where there is skin damage due to varicose veins or hidden varicose veins with venous reflux. Grade 5 is with healed venous ulcer and grade 6 is with venous ulcer.(*www.thewhiteleyclinic.co.uk/self-assessment/ceap-classification)* This paper describes the patterns at deep venous junctions, how incompetent perforators are distributed and how prevalent deep venous reflux is in South Indian patients.

Abbreviations used
SFJ - sapheno-femoral junction
SPJ - sapheno-popliteal junction
CEAP - Clinico-Etiological Anatomical and Pathological
GPJ – gastrocnemius vein junction

Methods
The study was conducted over a period of two years in patients who were referred to for the Doppler evaluation of varicose veins. All the patients who participated had clinically diagnosed varicose veins. Those having varicose veins that arose as a result of another disease such as thrombophlebitis or venous thrombosis were excluded from the study (Irodi, Keshava, Agarwal, Korah, & Sadhu, 2011) [5]. The examinations were all conducted on the Ultramark 9 machine having a MHz linear probe. Ultrasound scanning, color and spectral Doppler were used. Patients were examined while standing and having their weight supported by a contralateral extremity. The surface of the entire lower limb was examined. Diseased legs and hands were examined and their symptoms recorded. Grading was thus done to assign the different patients to their respective CEAP grades. The ethics committee clearance has been obtained before the commencement of the study.

Observation and Results

The observations were made in the total of 100 patients. Out of that 6 patients scored 0, 75 patients scored 1, 18 patients had a score of 2 while 1 patient had score 3.

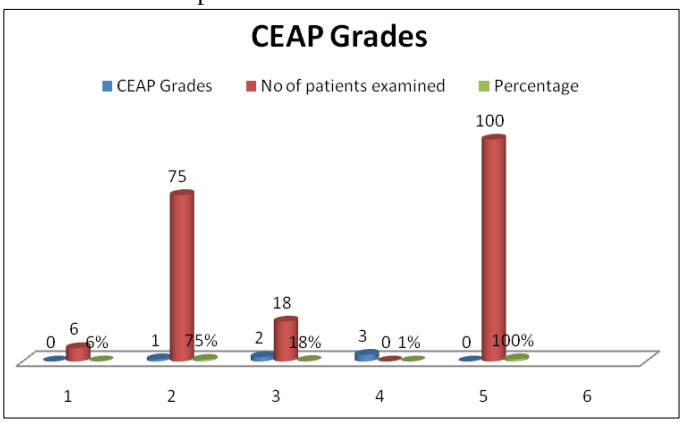

Fig 1: The bar chart shows the CEAP grade distribution

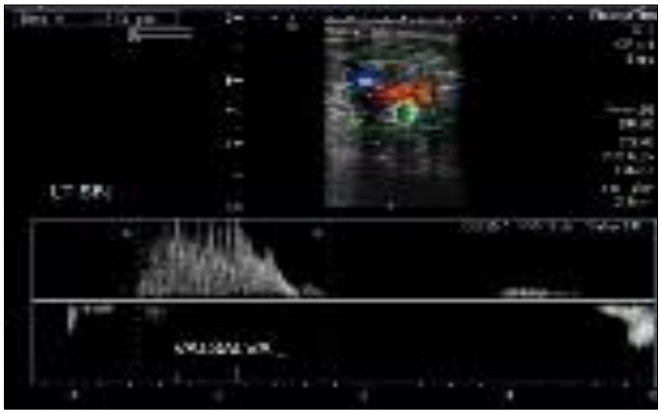

Fig 2: Doppler image of a reflux at sapheno-femoral junction

The patients also had the diameter and area of their femoral vessels measured at the SFJ within the groin. Additional measurements for the popliteal vessels were also done. The deep venous reflux was examined from three major points, namely: the femoral vein, popliteal vein and the GPJ junction. Incompetence was examined at the junction sites such as the SFJ and SPJ as well as in perforator veins. The incompetence was also assed using the Doppler analysis during the Valsalva maneuver (Masuda, Kistner, & Eklof, 1994) [8]. Total calculations for seven sites of the saphenous vein were measured. The distribution of incompetent perforators was recorded for the South Indian patients.

Discussion

Studies in epidemiology show that different regions have different levels of varicose veins occurrence, with lead zones being in Europe and America, while mild zones being in developing countries of Black Africa and the Far East (Lim & Davies, 2009). Despite this, few studies have been conducted on the Indian population, leaving the prevalence of varicose veins among the Indian population largely unknown. Despite this, the disease affects a large number of Indian patients and could lead to morbidity. A survey aiming to determine the prevalence of the condition among railway sweepers found that Northern Indian sweepers had a prevalence of 6.8%, while South Indian sweepers had 25.08% prevalence. This study incorporated 323 men from the South and 354 men from the North India(Malhotra, 1972).

Despite the fact that venous problems are largely caused by thrombosis obstruction, chronic venous conditions will be caused by reflux. This is a retrograde flow of blood in veins which occurs due to incompetent or absent valves. This way, high pressure blood moves from deep veins into superficial veins causing various adverse effects such as pigmentation of the skin and ulceration. The Doppler test is considered to be the best standard for measuring the extent of the venous damage in a non-invasive yet functional manner (Dixon, 1996) [1]. The Valsalva maneuver was used in this case due to the ease with which it can be performed (Irodi, Keshava, Agarwal, Korah, & Sadhu, 2011) [5].

Varicose veins have been found to be more prevalent among women due to hormonal factors (Evans, Fowkes, Ruckley, & Lee, 1999) [2]. Despite this, the study recorded in 55 males and 22 females could be attributed to the less number of women seeking medical help due to the problem. In this study, a higher number of left side limbs were affected (59) as opposed to right limbs (41). Notwithstanding, other studies have shown equal involvement for both limbs (Evans, Fowkes, Ruckley, & Lee, 1999) [2].

The study also found that the deep venous reflux was present in 50% of the cases. All these cases were accompanied by venous reflux at junctional sites and perforators. Literature places the range of 35.3% to 92.3% for patients with chronic venous insufficiency (Ioannou, Giannoukas, Kostas, & Kafetzakis, 2003) [4]. The majority of the cases also showed incompetent perforator veins (96%). As described in literature, most perforators were found in the medial section of the leg. The average number of incompetent perforators in the upper half of the posterior leg was 2 or 3.

No statistically significant correlation was found between the size of deep veins and their corresponding arteries with the amount of reflux. This could point to the fact that any dilation in the deep venous system could occur as a result of any number of factors aside from reflux. For example, research shows that deep veins could be dilated when increased blood flow enters from the deep venous system in cases of superficial vein incompetence (Walsh, Bergan, Beeman, & Comer, 1994). Significant correlation was found between the duration of the reflux at SFJ and SPJ with the diameter of the saphenous veins. The number of incompetent perforators was found to have an effect on the severity of the disease, all of which are findings backed in other studies (Stuart, Adam, Allan, Ruckley, & Bradbury, 2000) [9].

Conclusion

Conclusively, patients with varicose veins have multiple site incompetence as the most common pattern of their disease. The Color Doppler is useful in identifying the extent of reflux in patients for a complete diagnosis and incompetence mapping. This study revealed that there is high prevalence of varicose veins among South Indian patients.

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