



A STUDY OF LOWER LIMB BY VENOUS DOPPLER

Radiology

**Dr.Mayur
Khandhedia**

Associate Professor, Dept. of Radiology, Smt.B.K.Shah Medical institute & Research centre, Sumandeep Vidyapeeth, Piparia, Vadodara

**Dr.Vishalkumar
Bhardava**

Assistant Professor, Dept. of Radiology, Smt.B.K.Shah Medical institute & Research centre, Sumandeep Vidyapeeth, Piparia, Vadodara

ABSTRACT

INTRODUCTION: The role of lower limb venous doppler is crucial in diagnosis of Deep vein thrombosis ,varicose veins,arterio-venous malformation.DVT is the most common cause of morbidity and mortality.The dramatic presentation of DVT known as phlegmas dolens leads to gangrene,shock and death. DVT can endanger life of a person by producing pulmonary embolism.Varicose veins are the commonest in patients with occupational standing.The main objective is to study the spectrum of findings on color doppler in patients with clinically suspicion of lower limb venous pathology and to identify the patients who taken up for varicose surgery by locating and ruling out DVT in them

MATERIAL & METHODS: A prospective study of colour duplex sonography of lower limbs was carried out for 2 years.the study was carried out 100 patients of clinically suspected lower limb venous pathology.

RESULTS:100 cases were evaluated,ultrasound is non-invasive modality to diagnosis of varicose veins and deep vein thrombosis.Male(80%) predominated in our study.Swelling (34%)and varicosities(23%) were the most predominant symptoms.Prolonged hospitalization(20.51%) was the most common predisposing factor in patients diagnosed DVT and occupational standing(25.42%) were the commonest in patients with other causes of varicosities.

The predominant involvement was unilateral(90%) and left lower limb(52%).

In patients with DVT,thrombus was more common confined to femoro popliteal segment than in distal segment.

INTERPRETATION: Ultrasound is safe, accurate, non-invasive, easily repeatable, lack of radiation, widely available and cost-effective. So it is modality of choice for diagnosis of varicose veins and deep vein thrombosis.

KEYWORDS

INTRODUCTION

Ultrasound provides a non-invasive, reliable method for examining the venous system, particularly with respect to diagnosis, or exclusion of danger proximal thrombus in symptomatic patients. Ultrasound has supplanted conventional venography as the primary imaging modality in screening for and detecting deep vein thrombosis (DVT). The examination should include findings of intermittent compression, spontaneous flow, phasicity, augmentation, Valsalva response, and comparison of the contralateral common femoral vein waveform. Venous compression is the most reliable finding in detecting a DVT.

Doppler study allows the assessment of capacity auscultatory main trunks of the venous valves. Which allows for an overall assessment of the venous system.

The importance of the Venous Doppler examination of the lower extremities cannot be underestimated. Careful mapping of the lower extremity venous system prior to treatment is essential to a good clinical outcome. While many patients present with large, clinically obvious bulging varicose veins other individuals may have significant "silent" large vein disease (reflux), which can only be detected by Doppler vein mapping. Venous Doppler not only provides a detailed picture of venous system, but can show abnormal direction blood flow (reflux) in diseased veins. Successful treatment of leg veins requires accurate diagnosis with treatment of abnormal large veins followed by touch-up treatment of smaller veins.

Chronic venous insufficiency (CVI) is term used to valvular incompetence in superficial,deep and/or perforating veins incompetence of the venous valves permits reversal of flow and promotes venous hypertension in distal segments. This form of venous dysfunction may be the result of recanalisation of thrombosed segments, pathological dilatation of the vein or due to congenital absence of competent valves.¹

CVI is characterized by symptoms or signs produced by venous hypertension as a result of structural and functional abnormalities of veins. Symptoms may include aching, heaviness, leg tiredness, cramps, itching, sensation of burning, swelling, restless leg syndrome, dilatation or prominence of superficial veins, and skin changes. Signs may include telangiectasia, reticular or varicose veins, edema, skin changes such as pigmentation, lipodermatosclerosis, eczema, ulceration.²

The most frequent causes of CVI are primary abnormalities of venous valves and secondary changes due to venous thrombosis that can lead to reflux, obstruction or both. Congenital malformations are rare causes of CVI. Because the history and clinical examination will not always indicate the nature and extent of underlying abnormality(anatomic extent, pathology and cause),a number of diagnostic investigations developed that elucidate whether there is calf muscle dysfunction and can determine the anatomic extent and functional severity of obstruction or reflux.²

CVI may affect only the superficial veins or it may be a sequela to deep vein thrombosis. Deep vein thrombosis can cause pain, swelling of the affected limb and it may also cause structural damage to the valves of deep veins, which results in post phlebitis syndrome. DVT of the lower extremity is the one of the most common cause of pulmonary embolism. which in turn is responsible for majority of the deaths.

Duplex ultrasound ,complemented with colour flow imaging ,has been validated as a sensitive and specific modality for the identification of superficial and deep vein thrombosis.⁴Valvular incompetence can be confirmed with spectral and colour doppler.

MATERIALS & METHODS

The study aims at diagnosing and following up cases of lower limb disorders in the department of radiodiagnosis of SBKS Medical Institute and research centre and Dhiraj general hospital, Vadodara. This study is performed using Ultrasonography.

Gray-scale, color Doppler, and power Doppler ultrasonography were used to study a variety of lower limb disorders.

INCLUSION CRITERIA

1. Only those patients willing to participate in the study were included.
2. Patients referred to the radiology department for lower limb venous Doppler investigation, and found to have positive findings, will be included in this study.
3. All cases needing follow up will also be included in this study
4. All accidentally diagnosed cases of lower limb disorders will also be included in this study.

RESULTS

Table : 01 SEX DISTRIBUTION OF CASES

Sex	Cases	
	No.	Percentage
Male	80	80
Female	20	20
Total	100	100

Male predominance was found in our study. Of the 100 patients 80 were males and 20 were females.

Table : 02 AGE DISTRIBUTION

Age (in Years)	Cases	
	No.	Percentage
1-10	1	1
11-20	4	4
21-30	11	11
31-40	24	24
41-50	30	30
51-60	18	18
61-70	12	12
Total	100	100

Age of patients ranged from 8 to 68 years, 61% patients were older than 40 years

Table : 03 TYPE OF INVOLVEMENT

	No. of cases	% of cases
Unilateral	90	90
Bilateral	10	10
Total	100	100

Our study showed unilateral predominance (90%)

Table : 04 DISTRIBUTION OF INVOLVEMENT OF RIGHT AND LEFT LIMB

Extremities	No. of cases	Percentage
Unilateral Right	38	38
Left	52	52
Bilateral	10	10
Total	100	100

Left lower extremity predominance (52%) is noted in our study and bilateral involvement in 10 cases.

Table : 05 Distribution of cases

Cases	Number	Percentage
Varicose veins	59	59
DVT	39	39
Arterio-venous malformation	2	2

Table : 06 DISTRIBUTION OF CASES BY SYMPTOMS

Symptoms	Cases	Percentage
Swelling	34	34
Pain	16	16
Varicosity	23	23
Ulcer	14	14
Varicosity & swelling	6	6
Varicosity & Pain	5	5
Eczema	3	3
Total	100	100

We found swelling (34%) was the most common presenting symptom, followed by varicosity (23%) as the second most common presenting symptom.

DISCUSSION

The peripheral veins may be affected by a variety of disorders which can be assessed by the ultrasound.

DVT and thromboembolic diseases are the most common indications for investigation of the peripheral veins, but venous insufficiency and vein mapping are also indications for examining the veins.

The present study was performed to assess the role of color doppler in case of thrombosis and varicose veins.

It included the detection of thrombus and extent of its involvement, assessment of valvular incompetence, distinguishing between reflux and obstruction and diagnosis of DVT, thus helping to ensure safe and effective treatment. Among the 100 positive cases studied for suspected venous pathology, colour doppler doppler was effective in excluding other causes of pain and swelling, thus preventing unnecessary interventions and medical therapy.

AGE

The range of age of patients with venous abnormalities in our study was 1-70 years. We studied a total of 100 patients, the study group which showed maximum incidence was the age group 41-50 years, 30 cases (30%).

Belcaro G et al (2002) Italy In a randomized controlled study, found that 100 venous abnormalities increased with increasing age.

Edinburgh Vein Study (Evans, 1999⁷), the prevalence of trunk varicose in the from 11.5% in persons aged 18 to 24 years to 55.7% in the population between 55-64 years of age.

These studies correlate well with our study; in which out of the total 100 cases, 61 (61%) were more than 40 years. The mean age of cases with CVI in our study was years.

SEX

These studies correlate well with our study; in which out of the total 100 cases, 20 cases are female showing doppler features of venous abnormalities.

These findings correlate well with the study done by Strandness et al (1983) in which they showed a higher incidence of chronic venous insufficiency in males. In their study 66% of the male patients had a positive study.

In another study Evans CJ et al⁷ (1999) {Edinburgh Vein Study} had also found 101 definite male predominance. However, contradictory to these findings, many of the published epidemiological studies like Canonico (1998) Italy (prevalence in males 17% compared to 35.2% in females), Capita^o (1995) Portugal (males 17.8%, Female 34%), Laurikka⁸ (1995).

Finland {males 19%, females 43%} and Komsuoglu (1994)⁹ Turkey {males 14.6%, females 22.1%} have found that the female gender is one of the risk factors for CVI.

TYPE OF INVOLVEMENT

In our study, venous abnormalities were more common in the left extremity. 52 cases, 38 showed right side involvement and bilateral involvement was found in 10.

This is in correlation with the study conducted by Cockett, Nigès and Thomas (1976) who showed that the venous abnormalities were more common in the left 46 extremity. This was attributed to the crossing over of left common iliac vein by right common iliac artery, giving rise to venous stasis. Also in a venographic study of the incidence of DVT, Stamatakis JD et al (1978)¹⁰ found that major thrombi occur more frequently in the left limb.

DVT

LOCALISATION AND EXTENT OF THROMBOSIS

Colour Doppler ultrasound helps in exact localization of the thrombus. In the present study, thrombosis was localized to thigh or popliteal region in 24 (61.63%) of the total 39 cases of DVT. This roughly correlates with the study by Hill SL et al (1997) who found 49% thrombi in the thigh or popliteal region without calf involvement.

The distribution of thrombi in the present study are as follows- 2.66% in CIV, 20.61% in EIV, 53.85% in CFV, 72.22% in SFV, 61.63% in PV, 10.26% in ATV, 17.95% in PTV and 10.26% in the Superficial veins

DISTRIBUTION OF VARICOSITIES

This includes both primary and secondary varicosities involving 61 patients whose Doppler findings were suggestive of varicosities. Patients had 38 left sided involvement, 52 right sided involvement; patients had 10 bilateral involvement.

Varicosities along GSV predominated in our study, 45cases ; and along SSV 16cases were noted. Saphenofemoral junction incompetence was commonly noted in 23 of our cases. Out of the 23cases of SFJ incompetence, 19ases showed incompetence associated with dilation of superficial venous system .

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