



Evaluation of lower limb venous insufficiency using color duplex modality- A prospective analytical study

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Abstract

The introduction of doppler ultrasound technique has irrevocably altered the diagnosis and treatment of CVI. The reason is quite simple: thrombotic obstruction of the underlying vein distorts the venous flow pattern which is readily picked up by doppler. Its non-invasive, easy to perform and repeatable, can be done at patient's bedside or even at home and the result is available immediately. It can be used in pregnant women, enables multiple views in various positions of the leg and the study is safe, painless, and inexpensive. To evaluate the range of different imaging findings on Color Duplex Ultrasound in patients who are referred with sign and symptoms of Varicose Veins and Chronic Venous Insufficiency; To evaluate the association of DVT in Varicose Veins in order to rule out the risk of pulmonary embolism, to operate the patient for varicose surgery. Duplex scan can help vascular specialists in the planning of lower extremity venous interventions. CVI scans can be highly satisfying examinations from the both specialist and patient's point of view as it as a non-invasive procedure.

Keywords: Venous insufficiency, prospective analytical, symptoms of varicose

Introduction

The spectrum of venous abnormalities of lower limb ranges from common varicose veins to more morbid deep vein thrombosis. Duplex ultrasonography has been proven to be a sensitive and specific method for identifying superficial and deep vein thrombosis when combined with colour flow imaging.

AIMS & OBJECTIVES

- To evaluate the range of different imaging findings on Colour Duplex Ultrasound in patients who are referred with sign and symptoms of Varicose Veins and Chronic Venous Insufficiency.
- To evaluate the association of DVT in Varicose Veins in order to rule out the risk of pulmonary embolism, to operate the patient for varicose surgery

Materials & methods

Source: Al Ameen Medical College and Hospital, Vijayapura, Karnataka

Type of study: Prospective Analytical Study

Study duration: November 2020 to May 2022

Patients: 70 patients of either gender and age, with clinically suspected Chronic Venous Disease

Instrumentation: High-Resolution Duplex Doppler Sonography using GE LOGIQ P9 ultrasound machine with 5-13MHz linear transducer.

Inclusion criteria

1. All patients clinically suspected to have Chronic Venous Disease
2. Patients who present with swelling, pain, and ulcer of foot and leg.
3. Patients of both sexes and all age groups.

Exclusion Criteria

1. All patients with suspected arterial and lymphatic diseases of lower limb were excluded.
2. Pregnant women

Investigation

- USG
- Duplex ultrasound

Anatomy

Venous anatomy

The lower limb veins can be grouped into three anatomically and functionally distinct groups

1. The deep veins
2. The superficial veins
3. The perforators

- **The Deep Veins:** Most venous return from the lower extremities is channeled through the deep system. In normally functioning perforating veins valves maintain flow in one direct from superficial to deep.

- **The Deep Veins include:** 1. Inferior Vena Cava 2. Iliac veins 3. Femoral venous systems 4. Popliteal and Calf veins

- **Superficial lower extremity veins:** These comprises of
 - a. The long saphenous vein
 - b. The short saphenous vein

- **Perforator veins:** These normally carry blood from the superficial system to deep system.

CVI (Chronic venous insufficiency)

- Venous insufficiency/venous dysfunction problems comprises of two main categories: Acute and chronic.

- Acute problems consist of deep venous thrombus (DVT) and superficial thrombophlebitis alone or in combination.
- Chronic problems of venous dysfunction are due, in most cases, to reflux or backward flow through failed valves. Chronic difficulties are due to failure of function called venous stasis.

DVT

- DVT Characteristics usually associated with acute clot are the following
 1. Faintly echogenic (hypoechoic) thrombus
 2. Poorly attached thrombus
 3. Spongy-texture thrombus
 4. Dilated vein (when totally obstructed)
- There are essentially four ways to check for reflux
 1. Direct visualization of valve closure
 2. Doppler waveform evaluation. Color and pulsed Doppler should be utilized to check for venous reflux.
 3. Color flow evaluation
 4. Gray-scale evaluation

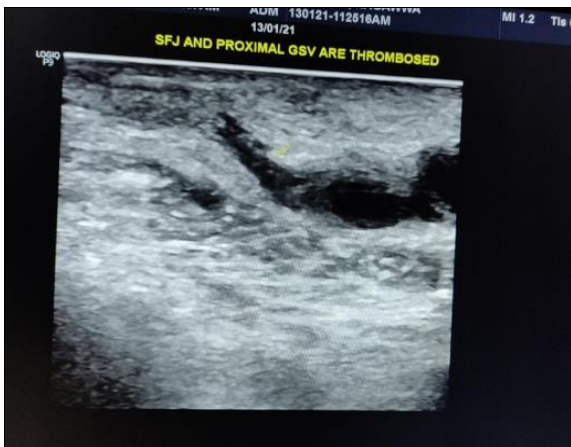


Fig 1



Fig 2

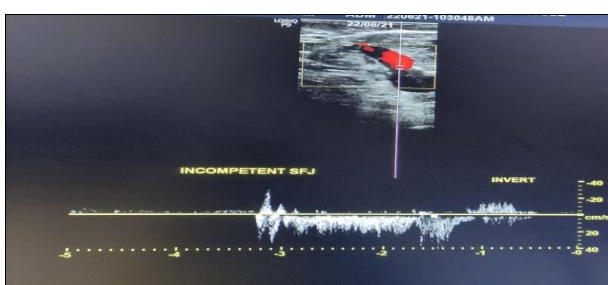


Fig 3

Results

Of the total 70 cases, 58 (82.85%) cases showed positive doppler findings, and 12 (17.15%) cases were normal. Male [53 (75.71%)] were more dominant with higher positive doppler findings. Swelling [20 (28.57%)] and varicosities [18 (25.71%)] were the most predominant symptoms. Out of 58 positive Doppler cases, 24 (41.37%) showed DVT. Thrombus was confined to femoro-popliteal segment in 19(79.16%). A severe form of CVI with venous ulcer was noted in 15 cases, of which 13 (86.66%) cases showed underlying DVT. Out of 58 positive patients, Primary varicosities predominated in 30 cases (51.73%) followed by Varicosities secondary to DVT were seen in 24 cases (41.37%), and congenital causes in 4 cases (6.90%).

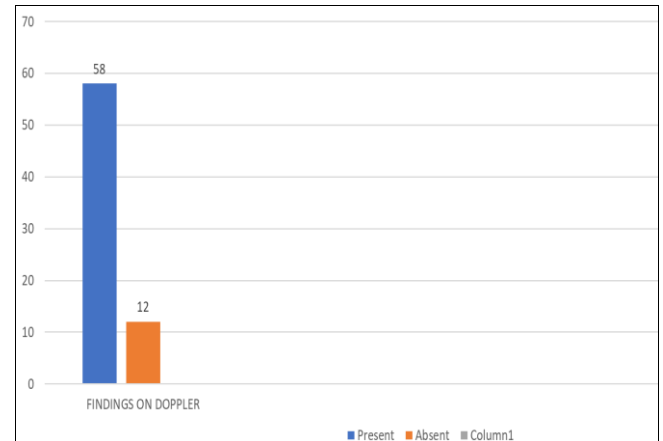


Fig 4

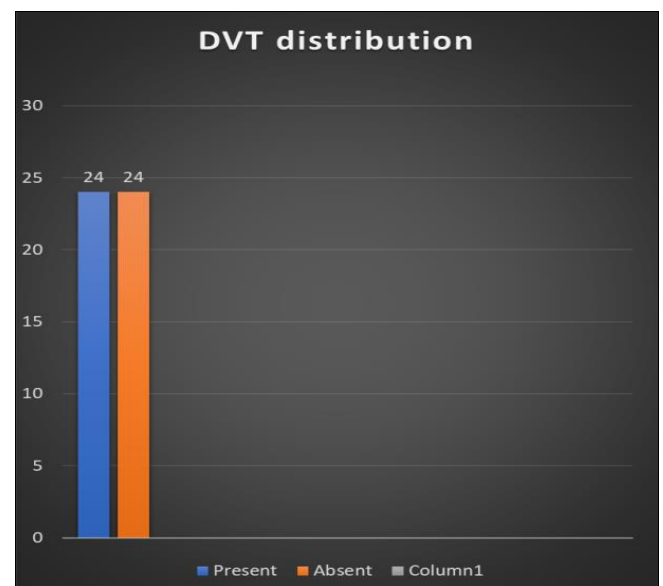


Fig 5

Discussion

- DVT, Venous insufficiency and vein mapping are the common indications for evaluating peripheral veins.
- The goal of the current study was to evaluate the contribution of colour flow duplex to chronic venous insufficiency. It helped to assure safe and effective treatment by detecting thrombus and determining the extent of its involvement, evaluating valvular incompetence, differentiating between reflux and obstruction, and classifying the varicosities as primary or secondary to underlying DVT.

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