

Duplex Ultrasound Investigation of the Veins in Chronic Venous Disease of the Lower Limbs—UIP Consensus Document. Part I. Basic Principles

P. Coleridge-Smith,^{1*} N. Labropoulos,² H. Partsch,³ K. Myers,⁴ A. Nicolaides⁵
and A. Cavezzi⁶

¹London, UK; ²Chicago, IL, USA; ³Vienna, Austria; ⁴Melbourne, Australia; ⁵Nicosia, Cyprus;
and ⁶San Benedetto del Tronto, Italy

Objectives. Duplex ultrasound investigation has become the reference standard in assessing the morphology and haemodynamics of the lower limb veins. The project described in this paper was an initiative of the Union Internationale de Phlébologie (UIP). The aim was to obtain a consensus of international experts on the methodology to be used for assessment of veins in the lower limb by ultrasound imaging.

Design. Consensus conference leading to a consensus document.

Methods. The authors invited a group of experts from a wide range of countries to participate in this project. Electronic submissions from the experts were made available to all participants via the UIP website. The authors prepared a draft document for discussion at a UIP Chapter meeting held in San Diego, USA in August 2003. Following this meeting a revised manuscript was circulated to all participants and further comments were received by the authors and included in subsequent versions of the manuscript. Eventually all participants agreed the final version of the paper.

Results. The experts have made detailed recommendations concerning the methods to be used for duplex ultrasound examination as well as the interpretation of images and measurements obtained. This document suggests a methodology for complete assessment of the superficial and perforating veins of the lower limbs, including recommendations on reporting results and training of personnel involved in these investigations.

Conclusions. The authors and a large group of experts have agreed a methodology for the investigation of the lower limb venous system by duplex ultrasonography.

Keywords: Consensus document; Duplex ultrasonography; Venous system; Chronic venous disease.

Introduction

Duplex ultrasonography is probably the most frequently used investigation to evaluate the venous system for the management of chronic venous disease (CVD) of the lower limbs. The results of many forms of treatment have been evaluated by duplex ultrasound and published in the medical literature. However, there is currently no systematic consensus agreement from phlebology or vascular societies on how duplex ultrasound for CVD is best performed. The aim of the document is to summarise best practices for venous duplex ultrasound examination of the lower limbs agreed upon by a group of clinicians who regularly use this

technology in their daily practice. Where possible, this has been based on objective information from the literature in addition to personal practice.

Methodology

The Union Internationale de Phlébologie (UIP) is an international organisation to which national societies of phlebology may subscribe as members. This society promotes scientific research and good clinical practice in venous disease through a number of initiatives including international congresses, sponsored research grants and consensus development meetings. Recent consensus publications have included a nomenclature of the lower limb veins¹ and proposals for the revision of the CEAP classification² which led to the recent publication of a revised CEAP classification.³

*Corresponding author. Philip Coleridge Smith, DM, FRCS, Thames Valley Nuffield Hospital, Wexham, Bucks SL3 6NH, UK.
E-mail address: p.coleridgesmith@ucl.ac.uk

The UIP wished to promote a consensus on methods of investigation and interpretation of duplex ultrasonography in venous disease and invited three authors (AC, PCS, NL) to gather a group of international experts on duplex ultrasound in CVD. The Consensus Group acted individually to provide personal opinions that did not necessarily reflect policies of scientific or medical societies to which they may have been affiliated. The experts were invited to submit contributions that they felt encapsulated important aspects of clinical practice of duplex ultrasound examination of the venous system. Electronic submissions made by the experts were made available to all participants via the UIP website. The submissions included references to papers, photographs, diagrams and suggested text for the consensus document. The references provided during this process were not intended to form a systematic review of the literature but were selected to support statements made in the final document where evidence exists. The authors acknowledge that many of the statements concern subjects, which have not been the subject of detailed scientific study and reflect the personal practice of the experts. The organisers prepared a draft document that was placed on the UIP website, and this was discussed and further submissions and recommendations were made. Many of the experts and the organising committee as listed at the end of this document met at a chapter meeting of the UIP in San Diego in August 2003 to discuss the consensus documents and other submissions. A further draft of the document was then circulated to all contributors who again added their comments. A final document was agreed amongst all experts after further revisions of the manuscript.

The authors consider that the methodology above achieved a credible consensus process. The references in the document are intended to support statements and are not intended to be an exhaustive review. The Consensus Group gave consideration to using a formal assessment of every clinical study quoted to classify it according to clearly defined levels of evidence. This approach was rejected because few studies with high levels of evidence have been published in this area. Recommendations are based on available evidence and the combined clinical experience of the Consensus Group.

The authors suggest that implementation of the recommendations should be performed according to the facilities available in individual institutions. We envisage that our this document should form the basis of local protocols rather than an inflexible set of instructions.

Aim of the duplex ultrasound examination

The duplex ultrasound examination in patients with CVD should demonstrate both the anatomical patterns of veins and abnormalities of venous blood flow in the limbs. The following data should be established:

- (1) Which saphenous junctions are incompetent, their locations and diameters.
- (2) The extent of reflux in the saphenous veins of the thighs and legs and their diameters. The number, location, diameter and function of incompetent perforating veins.
- (3) Other relevant veins that show reflux.
- (4) The source of filling of all superficial varices if not from the veins already described.
- (5) Veins that are hypoplastic, atretic, absent or have been removed.
- (6) The state of the deep venous system including competence of valves and evidence of previous venous thrombosis.

Explanation

Most patients undergoing duplex ultrasound to investigate the superficial, deep and perforating veins are being considered for treatment of varicose veins. Information provided by the investigation will usually have a significant impact upon whether the treatment is offered and the type of treatment considered most appropriate. Patients with incompetent saphenofemoral or saphenopopliteal junctions may be offered surgery, (duplex-guided) sclerotherapy or an endovenous procedure (radiofrequency closure or endovenous laser therapy). Those with isolated incompetence of saphenous tributaries could be treated by phlebectomy or sclerotherapy. Failure to identify and treat all sources of venous filling is likely to result in early recurrence of varices.

The Duplex Scan

Indications for duplex scanning

Since venous reflux commonly affects both limbs, it is recommended that both limbs be studied at the initial investigation, even if only one shows evidence of venous disease although this is dependant on the resources of the diagnostic service.

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