

Application of Clinical Practice Guidelines for the Management of Varicose Veins and Chronic Venous Disease to Canadian Practice

Part One: Presentation, Assessment and Classification

David Szalay, Beverley Chan, Dion Davidson, Oriana Gismondi, Adam Power, Douglas Wooster, Varun Kapila

INTRODUCTION: Management of Chronic Venous Disease: A Canadian Perspective

Chronic Venous Disease is a very common entity encompassing everything from spider (telangiectasia) and varicose veins to more advanced findings and skin changes including venous ulceration. The prevalence of chronic venous disease in adult populations can exceed 60 per cent with at least half (more than 30 per cent) presenting with symptoms and or signs that impact their health and or quality of life.¹⁻³ Chronic venous disease is indeed chronic and while there are many effective treatments, symptoms and findings can persist and will often progress over time.³⁻⁴

While it is reasonable to presume that virtually all primary care practices in Canada will have significant numbers of patients with Chronic Venous Disease (CVD), practitioners will have varying degrees of experience and comfort in managing patients with CVD thus may look for assistance, particularly for those patients with more advanced stages of disease.

The following chart highlights practitioners that have taken a particular interest in the management of patients with Chronic Venous Disease:

Practitioner	Description	Governing body	Number in Canada
Phlebologists	Physicians with a specific interest and additional experience in management of venous disease	Canadian Society of Phlebology; American Vein and Lymphatic Society; International Union of Phlebology	Approximately 170 members of the Canadian Society of Phlebology ⁵
Vascular Surgeons/ General Surgeons / Interventional Radiologists	Physicians with additional training and experience in the management of CVD; Variable level of interest, experience and involvement in CVD management	Canadian Society for Vascular Surgery; Society for Vascular Surgery (United States); European Society for Vascular Surgery	Approximately 200 Vascular Surgeons in Canada ⁶ ; Difficult to quantify General Surgeons and Interventional Radiologists with this practice focus

Health care costs in Canada are covered by (provincial) government insurance plans, however in some instances by supplemental employer or private plans and / or patients themselves. The organization, delivery and oversight of health care services varies amongst the provinces and territories and results in disparities in availability of and coverage for certain treatments including those related to the management of chronic venous disease.

We are therefore tasked to manage a very common problem while challenged on a number of fronts including access to a relatively low number of specialists

with interest and experience, limited availability and coverage for some diagnostic tests and treatments, and perhaps an overall perception of lower acuity or clinical significance of chronic venous disease. Recognition of these challenges and an improved understanding of chronic venous disease in general can help us take steps towards addressing some gaps in care and improving the general well-being of many of our patients.

PURPOSE AND SCOPE

The overall goal of this paper is to provide a high level, practical approach to identifying and classifying our

patients with varicose veins and chronic venous disease in a manner that recognizes and is consistent with current resources and accessibility in Canada. We feel that it will have value to both primary care practitioners and those with a further practice focus on CVD. In primary care practices this can help facilitate early identification of those patients who would most benefit from conservative management options or a specialist referral for further investigation and intervention. Physicians and surgeons who have a devoted interest in chronic venous disease may find this review helpful in the organization and structure of their own practice, and in communication with their referring physicians to help clarify the respective roles that primary care practitioners and consultants can play in the management or co-management of their patients with CVD.

In our review we refer to the consensus guidelines published by the leading international organizations focused on management of chronic venous disease, namely the Society for Vascular Surgery / American Venous Forum, the European Society for Vascular Surgery, and the American Vein and Lymphatic Society.⁷⁻¹¹ In addition we reference selected key papers and developments, which have helped in the establishment of these guidelines or occurred in the years following their publication. In the interest of time and space we will focus on and provide information that we feel is fundamental and helpful to Canadian physicians and surgeons. We encourage readers who are in search of further information to directly access the very comprehensive source documents.

METHODOLOGY

The Canadian Society for Vascular Surgery put out a call for interest for members who wished to participate in an initiative that focused on providing guidance for best clinical practice in the management of varicose veins and chronic venous disease in Canada. Six vascular surgeons and one physician assistant from diverse, representative practice settings (community and academic) and stages of career were selected. Participants were asked to identify and disclose any existing relationships and or potential conflicts of interest that could impact the process, content and ultimately recommendations of the document. The scope, structure and ultimate goals of the project were identified with the understanding that the overall objective was to identify, summarize and interpret existing guideline from a Canadian context.

An initial search of the English literature was performed to identify the most up to date guidelines on the management of chronic venous disease (as noted in the previous section). Authors were assigned sections and asked to refer to these guidelines and any other significant papers or interval developments related to current clinical practice. The sections were submitted to the project lead and collated into a larger document. Through an ongoing iterative process all members edited and condensed the work into the final document.

The last step was the creation of consensus recommendations with the addition of identifying any potential barriers in current Canadian practice. These recommendations do specifically refer to existing guidelines (and leave grading systems as they had established), as well as any other supporting evidence identified in our review.

ORGANIZATION AND OUTLINE

This document is organized to cover the following topics we feel are most relevant to understanding and classifying chronic venous disease. These include *Background, Clinical Presentation, Diagnostic Imaging, Classification and Scoring Systems*. A complimentary review will further explore *Treatment and Post-Treatment Follow Up and Assessment*. The two documents in conjunction aim to provide an overview of comprehensive care of varicose veins and chronic venous disease for the primary care practitioner and those with a particular interest in this field.

BACKGROUND

Definition / Terminology

Any understanding of chronic venous disease should start with knowing background information regarding the *prevalence* – how common is it; *anatomy* – how do we name and describe veins; *etiology* – how does it arise; and *risk factors* – what can predict increased risk or who is at risk?

Brief Summary of the consensus guidelines

The prevalence of chronic venous disease is very high. It is a very wide spectrum of disease involving anything from symptoms in the absence of clinical findings to varicose veins (small and large), edema to large venous ulcers. The clinical presentation and classification of CVD will be discussed further in latter parts of this document. In its' broadest definition, symptoms and

or signs of CVD can be found in more than 60 per cent of adults.¹⁻²

Anatomic descriptors and terminology have been standardized to describe superficial veins (which lie below the skin and above the muscle fascia), deep veins (which accompany arteries) and the perforating veins that travel between the superficial and deep systems.¹² Bicuspid venous valves direct flow from distal to proximal and superficial to deep veins.

The etiology or pathophysiology of chronic venous disease in simplest terms is attributed to reflux (reversed flow through the valves), obstruction or both.^{7,9,13} There are additional factors such as inadequate or incomplete venous emptying due to poor use of the calf muscle pump. With respect to superficial venous reflux, failure of the valve is not considered to be the primary pathophysiology, rather it is secondary to a weakening or defect in the smooth muscle of the vein wall leading to loss of elasticity, local dilation and a resulting inability of the valve leaflets to oppose. The resulting reflux and increased venous pressure exacerbate the problem, further weakening the vein walls below the incompetent valve. In deep veins, post-thrombotic obstruction and or secondary deep valve reflux due to scarring from previous thrombus are more significant than primary reflux. A full description is beyond the scope of this review but there is also a fair bit of evidence that venous pooling, increased sheer stress on the venous endothelium and chronic inflammation are significant etiologic factors in the development and progression of varicose veins and venous disease.

Established risk factors include family history / genetic predisposition, older age, female gender, previous pregnancy, obesity, height, and occupations that require prolonged standing or are sedentary (prolonged sitting).^{7,9,14} Other contributing factors could be a past history of deep venous thrombosis, arteriovenous fistulae (congenital or acquired), or in rare instances increased abdominal pressure resulting from a mass or tumor.

Application to (Canadian) Practice

(In contrast to some of the sections below) there are no considerations regarding prevalence, anatomy, etiology nor risk factors that are particularly unique or different to practice in Canada. Practitioners can simply be reminded that chronic venous disease is very common in the population as a whole and perhaps even more so in those with identified additional risk factors.

CLINICAL ASSESSMENT

Definition / Terminology

Clinical Assessment refers to the performance and documentation of the relevant history and physical examination of patients presenting with chronic venous disease. Together with imaging (where indicated) clinical assessment is key to scoring and classification systems described in later sections.

Brief Summary of the consensus guidelines

There is a highly variable presentation for patients with chronic venous disease and it is important to note that symptoms are not necessarily well correlated to findings on physical examination. Patients with very large varicosities and or secondary skin changes may report little to no symptoms while some patients with relatively unimpressive findings may have significant complaints.

A thorough history for a patient presenting with chronic venous disease should cover common risk factors noted earlier including family history, occupation, prior pregnancies and any associated complications such as previous deep or superficial venous thrombosis, bleeding from varicosities or open wounds / ulcers. Local and generalized symptoms should be documented.^{7,9,15} Common symptoms attributed to varicose veins included local throbbing, itching, burning or tingling over the varicosities. For chronic venous disease as a whole there are often more generalized symptoms of leg heaviness, fatigue, and / or a sense of fullness or swelling. Symptoms are often worse in warmer weather, after prolonged standing or sitting and at the end of the day. Rest and elevation help relieve the symptoms. Some patients may not have any symptoms but can be sufficiently concerned about the appearance that results in a significant impairment in reported quality of life.

Findings on physical examination (which at least in part should be done with the patient in a standing position) can range from a few clusters of spider veins or telangiectasia to much larger bulging varicosities, edema and skin changes ranging from early pigmentation and eczema to atrophy of the subcutaneous fat and active or healed ulceration.^{7,9,15} The location and extent of varicosities and or skin changes may give some indication of the origin or site of reflux. Bedside tests including the use of a tourniquet or hand-held doppler have been employed to “diagnose” or localize the source of reflux but these generally have poor sensitivity and or specificity.⁷⁻⁹

Application to (Canadian) Practice

For primary care physicians an understanding of the key history, symptoms and signs to identify in the clinical assessment of chronic venous disease should not be underappreciated as this information alone can allow for the provision of advice and initial (conservative) treatment measures. These findings will also inform

the need for further investigation or specialist referral. For consultants a comprehensive clinical assessment is a key component in assessing where the patient fits in the classification of their chronic venous disease and is fundamental to scoring systems, which help measure current status and response to treatment.

Clinical Assessment Recommendations

Recommendation	Existing Guidelines	Additional support or references	Applicability to Canadian practice
1. The CSVS recommends a directed history focused on common risk factors, symptoms of venous disease, and possible complications including venous thrombosis, ulceration or bleeding	SVS/AVF – Grade 1 Level A* ESVS – Class I Level C**	Ref 14,15	No barriers All practitioners
2. The CSVS recommends a directed physical examination performed with the patient standing when possible, to document the presence of telangiectasia, reticular veins, varicose veins and more advanced skin changes of venous disease	SVS/AVF – Grade 1 Level A ESVS – Class I Level C	Ref 14,15	No barriers All practitioners

*The SVS/AVF use 2 grades (1,2) of recommendations and 3 levels of evidence (A,B,C)^{7,16}

** The ESVS use 3 classes (I, II, III) of recommendations and 3 levels of evidence (A,B,C)⁹

DIAGNOSTIC IMAGING

Definition / Terminology

Diagnostic imaging in chronic venous disease can employ a number of modalities including venous duplex scanning, intravenous contrast venography, CT and MR venography, intravascular ultrasound (IVUS) and venous plethysmography. Of all these options the initial and usually definitive imaging modality is a comprehensive venous duplex ultrasound study.

Brief Summary of the consensus guidelines

Venous Duplex Ultrasound: Venous duplex ultrasound (VDU) assessment is the most commonly employed imaging technique in the management of varicose veins and chronic venous disease.^{7-9,17-20} It is used to support the diagnosis, define associated pathology and identify the functional status of the deep and superficial veins and map the anatomy of normal and abnormal veins. VDU can identify complications such as deep (DVT) and superficial venous thrombosis (SVT) with an accuracy of 95-97% for a comprehensive study.²¹ It is an important tool in planning interventions and surveillance after intervention and for identified complications. VDU protocols are defined to assess for thrombosis and / or CVI (reflux) in the deep and / or superficial veins.

Specific mapping protocols are available to plan and guide interventions. ‘Custom’ protocols can be defined for focused assessment and surveillance.

Comprehensive venous testing, that includes assessment of the deep veins from the vena cava to the tibial veins and the superficial veins (both the great and small saphenous and significant tributaries) from their junctions to the ankle level, is the ‘gold standard’. Significant incompetent perforating veins are documented. Studies of the superficial systems for reflux are most often done in supine and standing positions. Such testing gives a full picture of the venous anatomy and any structural or functional pathology. The findings define the extent of disease, identify certain complications (in particular superficial vein thrombosis), contribute to understanding the natural history, and provide guidance to conservative and interventional management. All patients with CVD should be considered for a comprehensive venous duplex study; modified or incomplete studies should be noted as such and not relied upon to manage CVD. Standard published protocols are available to guide the technical performance and interpretation of the studies.²²⁻²⁵

The chart below further identifies imaging modalities used less frequently and for specific circumstances such as the planning or performance of specific interventions.

Modality	Image Provided/Use	Recommended Use
CT and MR Venography ²⁶	Excellent cross sectional imaging	<ul style="list-style-type: none"> Assess for intra-abdominal or pelvic venous obstruction/pathology Assess for vascular malformation in the extremities
Contrast Venography ²⁷	Acute iliofemoral deep vein thrombosis <ul style="list-style-type: none"> Diagnosis of bilateral leg swelling 	<ul style="list-style-type: none"> Diagnosis in rare circumstances Used for endovenous interventions (ie: coiling of pelvic varicosities; venoplasty/stenting)
Intravascular Ultrasound (IVUS) ²⁸	To identify deep venous disease <ul style="list-style-type: none"> Provide details on severity and nature of venous stenosis 	<ul style="list-style-type: none"> For planning purposes During intervention of deep venous disease
Venous plethysmography (air or straining gauge) ²⁹	Assess for venous obstruction, reflux and calf muscle function	<ul style="list-style-type: none"> Often a component of research protocols Does not provide anatomic detail Seldom available in clinical practice

Application to (Canadian) Practice

Primary Care Physicians will be familiar with venous duplex imaging but will be well served to know that there can be a wide disparity in the extent and quality of studies. Limited studies of the deep venous system may be sufficient to rule out deep venous thrombosis or obstruction but a far more comprehensive duplex

study of the superficial and deep venous systems will be required for full classification and or planning intervention in chronic venous disease. Venography, IVUS and plethysmography are employed far less commonly and will be generally organized or performed by specialists to address specific questions or to plan or perform specific interventions.

Diagnostic Imaging Recommendations

Recommendation	Existing Guidelines	Additional support or references	Applicability to Canadian practice
1. The CSVS recommends a venous duplex as the primary study to diagnose, assess the anatomy and determine pathophysiology in Chronic Venous Disease	SVS/AVF – Grade 1 Level A ESVS – Class I Level A	Ref 17-25	Few barriers Venous Duplex widely available
2. The CSVS recommends the venous duplex be performed with a standardized protocol in an accredited non-invasive vascular laboratory	SVS/AVF – Grade 1 Level A ESVS – Class I Level A	Ref 17-25	Practice variable -confirm credentials and protocols of local imaging facilities
3. The CSVS recommends that further imaging modalities such as venography, intravascular ultrasound and plethysmography be reserved for selective circumstances and or planning / performing interventions	SVS/AVF - Grade 1 Level B ESVS –class and level vary by modality	Ref 26-29	Availability limited to referral centres

CLASSIFICATION AND SCORING SYSTEMS

Definition / Terminology

The *CEAP Classification System* for Chronic Venous Disease as developed and revised by the American Venous Forum / Society for Vascular Surgery is the internationally accepted standard for classifying patients with varicose veins and chronic venous disease

and should be used by all Vascular Surgeons.^{7,9,30-32} The Clinical (C), Etiologic (E), Anatomic (A) and Pathophysiological (P) descriptors and nomenclature provide a clear understanding of the clinical picture and guide treatment options.

There are also a number of questionnaires and scoring systems used to provide more objective assessment of symptoms and findings at time of initial presentation and post treatment.

Brief Summary of the consensus guidelines

The CEAP Classification (overview)

Class	Description	Scoring Scale
Clinical (C)	Location and size of veins, along with associated skin changes or ulceration	0-6 C ₀ – no visible sign of venous disease C ₁ – telangiectasia, reticular veins C ₂ – varicose veins C ₃ – edema C ₄ – pigmentation, eczema, lipodermatosclerosis C ₅ – healed ulcer C ₆ – active venous ulcer
Etiologic (E)	Determines prognosis, aids with appropriate treatment options and can be used to predict effectiveness of treatment	Primary Secondary Congenital No Cause identified
Anatomic (A)	Used to identify anatomic location of venous insufficiency	Superficial (A _s) Deep (A _d) Perforating (A _p)
Pathophysiologic (P)	Identifies the underlying venous pathology	Reflux (P _r) Obstruction (P _o) Reflux and Obstruction (P _{ro}) No venous pathophysiology (P _n)

*An extensive list of the classification abbreviations and most recent updates to classification nomenclature can be found on the CEAP 2020 Updated Guidelines (ref 31).

Scoring Systems : Measuring symptoms, quality of life and response to treatment

Many physicians / surgeons with an interest in venous disease will have their patients fill out commonly accepted and validated questionnaires such as the Aberdeen Varicose Vein Questionnaire (AVVQ), the Chronic Venous Insufficiency Questionnaire (CIVIQ), Venous Insufficiency Epidemiologic and Economic Study of Quality-of-Life (VEINES-QOL) or a number of similar other tools that measure patient – reported symptoms and quality of life.^{7,9,33} There are also physician generated measurement instruments such as the Venous Clinical Severity Score (VCSS), which assigns scores based on symptoms, signs and compliance with compression stockings.^{7,9,33-34}

Application to (Canadian) Practice

The CEAP classification is the standard used by Canadian specialists to describe patients they have assessed and or treated in a manner that is understood by other physicians with a similar practice interest. In addition these specialists will use the CEAP classification and a variety of validated scoring systems and measurement tools to objectively inform response to treatment for their patients and as outcome measures in any research trials. Primary care physicians would not be expected to know the specifics of classification or scoring tools but rather can simply be aware that standardized approaches to the description and measurement of chronic venous disease do exist.

Classification and Scoring System Recommendations

Recommendation	Existing Guidelines	Additional support or references	Applicability to Canadian practice
1. The CSVS recommends the use of the CEAP classification for Chronic Venous Disease	SVS/AVF – Grade 1 Level A ESVS – Class I Level B	Ref 30-32	Clinical (C) can be used by all E, A, P – may require additional imaging and expertise
2. The CSVS recommends the use of validated scoring systems and questionnaires when measuring symptoms, quality of life and response to treatment	SVS/AVF – Grade 1 Level B ESVS – Class II Level B	Ref 33-34	Use limited mostly to venous disease specialists

SUMMARY AND CONCLUSIONS

Chronic Venous Disease is very common and can be found in the majority of adult Canadians. Patients may have minimal to no symptoms or complain of quite debilitating discomfort. Findings can cover the spectrum from telangiectasia (spider veins) to advanced skin changes including venous ulcers. Most, if not all, primary care physicians will encounter patients with chronic venous disease in daily practice. We recognize that there can be significant regional differences or disparity in access to consultants with an interest in the management of chronic venous disease and / or specific treatment modalities. There is value in understanding fundamental principles related to the recognition and management of chronic venous disease in particular the etiology, risk factors, classification and medical / conservative management.

Canadian primary care physicians can provide guidance to their patients, initiate treatment where appropriate and identify those who may benefit most from further consultation or intervention. With respect to the latter it is important to help identify those consultants who have the requisite training and experience to provide an appropriate assessment and or opinion; and are in a position to offer a breadth of treatment options most suitable for the patient's specific anatomy and stage of disease. In recognition that this is chronic venous disease the same consultant should provide a plan or guidance for ongoing treatment and surveillance.

We trust that the preceding document provides an overview of a contemporary approach to chronic venous disease identification and classification in Canada. The next review (Part Two) will focus on interventions in CVD.

The vascular surgeons of the Canadian Society of Vascular Surgery are committed to ensuring evidence based best practice and ongoing innovation and advancement in the management of venous disease. We are far too few to manage the millions (tens of millions) of Canadians with these conditions. It is essential that we work with our primary care colleagues with the common goals of providing timely and appropriate assessment, treatment and follow up for our patients.

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