

EVIDENCE BASED STATEMENT

DOMAIN 2, Statement 2

TOPIC: "Venous reflux ultrasound appropriate detection"

SEARCH TERMS & SOURCES

((ultrasound) AND (venous)) AND (lower limb) AND (reflux)

INCLUSION CRITERIA

- Lower limb only
- Reviews
- Publication < 10 years, only ENG

SEARCH RESULT BEFORE - AFTER SELECTION

32 (before) - 8 (after selection)

PERTINENT LITERATURE NOT IDENTIFIED BY THE LITERATURE SEARCH

1. Chen CW, Tseng YH, Wong MY, Lin YH, Yang TY, Hsu YC, 2021, Using Non-Contrast MRA to Discriminate between Obstructive and Nonobstructive Venous Diseases of the Legs. *Diagnostics (Basel)*;11(8):1392.
2. Vitale, C., F. D'Abate and A. Froio "Needs of standardisation in reporting a venous lower limb ultrasound exam for the assessment of varicose veins." *Phlebology* 2021;36(8):665-667.
3. Srisuwan T, Inmutto N, Kattipathanapong T, et al. Ultrasound Use in Diagnosis and Management of Venous Leg Ulcer. *Int J Low Extrem Wounds* 2020;19(4):305-314.
4. Giancesini S, Menegatti E, Sisini F, et al. Comparison Between Duplex Ultrasound and Multigate Quality Doppler Profile Software in the Assessment of Lower Limb Perforating Vein Direction. *Eur J Vasc Endovasc Surg.* 2018 May;55(5):688-693.
5. Giancesini S, Sisini F, di Domenico G, et al. Lower Limbs Venous Kinetics and Consequent Impact on Drainage Direction. *J Vasc Surg Venous Lymphat Disord.* 2015 Jan;3(1):120.
6. Marston WA, Brabham VW, Mendes R, et al. The importance of deep venous reflux velocity as a determinant of outcome in patients with combined superficial and deep venous reflux treated with endovenous saphenous ablation. *J Vasc Surg.* 2008;48(2):400-5; discussion 405-6.
7. Cavezzi A, Labropoulos N, Partsch H, et al. Duplex ultrasound investigation of the veins in chronic venous disease of the lower limbs--UIP consensus document. Part II. *Anatomy. Vasa* 2007;36(1):62-71
8. Cappelli M, Molino Lova R, Ermini S, et al. Hemodynamics of the sapheno-femoral junction. Patterns of reflux and their clinical implications. *Int Angiol.* 2004 Mar;23(1):25-8.
9. Wong JK, Duncan JL, Nichols DM et al. Whole-leg duplex mapping for varicose veins: observations on patterns of reflux in recurrent and primary legs, with clinical correlation. *Eur J Vasc Endovasc Surg* 2002;25(3):267-75.

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IDENTIFIED REFERENCES

1. Vayssettes-Courchay C. A review of methodologies evaluating in-vivo superficial vein properties: focus on compliance and reactivity. *Int Angiol.* 2021 Oct;40(5):368-380.
2. Masuda E, Ozsvath K, Vossler J, et al. The 2020 appropriate use criteria for chronic lower extremity venous disease of the American Venous Forum, the Society for Vascular Surgery, the American Vein and Lymphatic Society, and the Society of Interventional Radiology. *J Vasc Surg Venous Lymphat Disord.* 2020 Jul;8(4):505-525.e4.
3. Spinedi L, Broz P, Engelberger RP, et al. Clinical and duplex ultrasound evaluation of lower extremities varicose veins - a practical guideline. *Vasa.* 2017 Aug;46(5):325-336.
4. Baliyan V, Tajmir S, Hedgire SS, et al. Lower extremity venous reflux. *Cardiovasc Diagn Ther.* 2016 Dec;6(6):533-543.
5. Sundaresan S, Migden MR, Silapunt S. Stasis Dermatitis: Pathophysiology, Evaluation, and Management. *Am J Clin Dermatol.* 2017 Jun;18(3):383-390.
6. Khilnani NM. Duplex ultrasound evaluation of patients with chronic venous disease of the lower extremities. *AJR Am J Roentgenol.* 2014 Mar;202(3):633-42.
7. Brown KR, Rossi PJ. Superficial venous disease. *Surg Clin North Am.* 2013 Aug;93(4):963-82, ix-x.
8. Arnoldussen CW, de Graaf R, Wittens CH, de Haan MW. Value of magnetic resonance venography and computed tomographic venography in lower extremity chronic venous disease. *Phlebology.* 2013 Mar;28 Suppl 1:169-75.

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TEXT FOR INCLUSION IN THE DOCUMENT

(300 words, not counting the references)

DOMAIN 02, Statement 02, TOPIC: “Deep and superficial systems venous segments to be assessed by ultrasound scanning”

Lower limb venous ultrasound report quality and appropriateness varies significantly among the different national and international centers. Properly validated venous scanning protocols should be adopted worldwide for the sake of both patient valuable evaluation and scientific data comparison.

Venous reflux threshold is set at 0.5 sec for the saphenous and its tributaries system, while it's at 1 sec for the femoral and popliteal axis.

Reports should avoid only qualitative color imaging, rather favoring quantitative spectral analysis.

***[Masuda E, Ozsvath K, Vossler J, et al. The 2020 appropriate use criteria for chronic lower extremity venous disease of the American Venous Forum, the Society for Vascular Surgery, the American Vein and Lymphatic Society, and the Society of Interventional Radiology. J Vasc Surg Venous Lymphat Disord. 2020 Jul;8(4):505-525.e4].**

Perforating veins are considered incompetent whenever exhibiting an outward diastolic flow lasting more than 0.35 sec. Nevertheless, a careful assessment should include the perforator net flow direction considering data showing a low sensitivity of the outward diastolic flow only assessment.

[Gianesini S, Menegatti E, Sisini F, et al. Comparison Between Duplex Ultrasound and Multigate Quality Doppler Profile Software in the Assessment of Lower Limb Perforating Vein Direction. Eur J Vasc Endovasc Surg. 2018 May;55(5):688-693].

More than one single maneuver should be adopted to elicit the flow considering a significantly different flow could be generated.

[Gianesini S, Sisini F, di Domenico G, Menegatti E, Vannini M, Spath P, Caneva PD, Occhionorelli S, Tessari M, Gambaccini M, Zamboni P. Lower Limbs Venous Kinetics and Consequent Impact on Drainage Direction. J Vasc Surg Venous Lymphat Disord. 2015 Jan;3(1):120].

This is particularly evident at the sapheno-femoral junction, where the sample volume should be positioned at the femoral side of the terminal valve, evoking the flow by means of both Valsalva and compression/relaxation maneuvers in order to avoid false positive results.

[Cappelli M, Molino Lova R, Ermini S, et al. Hemodynamics of the sapheno-femoral junction. Patterns of reflux and their clinical implications. Int Angiol. 2004 Mar;23(1):25-8].

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STATEMENT FOR PUBLIC EVIDENCE-BASED AWARENESS

statement " Lower limb venous echo-Doppler report must include the deep, saphenous and superficial system findings"

SELECTED REFERENCES

1. *Masuda E, Ozsvath K, Vossler J, et al. The 2020 appropriate use criteria for chronic lower extremity venous disease of the American Venous Forum, the Society for Vascular Surgery, the American Vein and Lymphatic Society, and the Society of Interventional Radiology. J Vasc Surg Venous Lymphat Disord. 2020 Jul;8(4):505-525.e4
2. Giancesini S, Menegatti E, Sisini F, et al. Comparison Between Duplex Ultrasound and Multigate Quality Doppler Profile Software in the Assessment of Lower Limb Perforating Vein Direction. Eur J Vasc Endovasc Surg. 2018 May;55(5):688-693
3. Giancesini S, Sisini F, di Domenico G, Menegatti E, Vannini M, Spath P, Caneva PD, Occhionorelli S, Tessari M, Gambaccini M, Zamboni P. Lower Limbs Venous Kinetics and Consequent Impact on Drainage Direction. J Vasc Surg Venous Lymphat Disord. 2015 Jan;3(1):120
4. Cappelli M, Molino Lova R, Ermini S, et al. Hemodynamics of the sapheno-femoral junction. Patterns of reflux and their clinical implications. Int Angiol. 2004 Mar;23(1):25-8

IDENTIFIED LITERATURE BIAS

Not standardized flow elicitation maneuvers

SUGGESTED NEXT LINES OF RESEARCH

Validation of a standardized and reproducible protocol for lower limb venous reflux assessment