

EVIDENCE BASED STATEMENT

DOMAIN **2**, Statement **8**

TOPIC: “ **Ultrasound follow-up protocol after first DVT episode**”

SEARCH TERMS & SOURCES

((ultrasound) AND (follow-up)) AND (venous thrombosis)

INCLUSION CRITERIA

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

SEARCH RESULT BEFORE - AFTER SELECTION

110 (before) - 11 (after selection)

PERTINENT LITERATURE NOT IDENTIFIED BY THE LITERATURE SEARCH

1. Pieralli F, Pomero F, Giampieri M, et al. Incidence of deep vein thrombosis through an ultrasound surveillance protocol in patients with COVID-19 pneumonia in non-ICU setting: A multicenter prospective study. PLoS One. 2021 May 20;16(5):e0251966.
2. Michiels JJ, Moosdorff W, Maasland H, et al. Duplex ultrasound, clinical score, thrombotic risk, and D-dimer testing for evidence based diagnosis and management of deep vein thrombosis and alternative diagnoses in the primary care setting and outpatient ward. Int Angiol. 2014 Feb;33(1):1-19.
3. Arabi YM, Burns KEA, Al-Hameed F, et al. Surveillance or no surveillance for deep venous thrombosis and outcomes of critically ill patients: A study protocol and statistical analysis plan. Medicine (Baltimore). 2018;97(36):e12258. doi:10.1097/MD.00000000000012258
4. Meissner MH. Duplex follow-up of patients with DVT: does it have clinical significance? Semin Vasc Surg. 2001 Sep;14(3):215-21.

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IDENTIFIED REFERENCES

1. Charisis N, Harb H, Harb M, Labropoulos N. A systematic review on long-term clinical impact in patients with iliofemoral deep vein thrombosis. *Phlebology*. 2021 Oct;36(9):710-718.
2. Healy DA, Twyford M, Moloney T, Kavanagh EG. Systematic review on the incidence and management of endovenous heat-induced thrombosis following endovenous thermal ablation of the great saphenous vein. *J Vasc Surg Venous Lymphat Disord*. 2021 Sep;9(5):1312-1320.e10.
3. Skeik N, Smith JE, Jensen JD, et al. Literature review of distal deep vein thrombosis. *J Vasc Surg Venous Lymphat Disord*. 2021 Jul;9(4):1062-1070.e6.
4. Robert-Ebadi H, Righini M. Should we diagnose and treat distal deep vein thrombosis? *Hematology Am Soc Hematol Educ Program*. 2017 Dec 8;2017(1):231-236.
5. Jones WS, Vemulapalli S, Parikh KS, et al. Treatment Strategies for Patients with Lower Extremity Chronic Venous Disease (LECVD) [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); 2017 Apr 6. PMID: 30222278.
6. Robert-Ebadi H, Righini M. Management of distal deep vein thrombosis. *Thromb Res*. 2017 Jan;149:48-55.
7. Michiels JJ, Michiels JM, Moossdorff W, et al. Diagnosis of deep vein thrombosis, and prevention of deep vein thrombosis recurrence and the post-thrombotic syndrome in the primary care medicine setting anno 2014. *World J Crit Care Med*. 2015 Feb 4;4(1):29-39.
8. Needleman L. Update on the lower extremity venous ultrasonography examination. *Radiol Clin North Am*. 2014 Nov;52(6):1359-74. 10.1016/j.rcl.2014.08.001. Epub 2014 Nov 4. PMID: 25444111.
9. Fabiá Valls MJ, van der Hulle T, den Exter PL, et al. Performance of a diagnostic algorithm based on a prediction rule, D-dimer and CT-scan for pulmonary embolism in patients with previous venous thromboembolism. A systematic review and meta-analysis. *Thromb Haemost*. 2015 Feb;113(2):406-13.
10. Michiels JJ, Moossdorff W, Maasland H, et al. Duplex ultrasound, clinical score, thrombotic risk, and D-dimer testing for evidence based diagnosis and management of deep vein thrombosis and alternative diagnoses in the primary care setting and outpatient ward. *Int Angiol*. 2014 Feb;33(1):1-19. PMID: 24452081.
11. Malgor RD, Labropoulos N. Diagnosis of venous disease with duplex ultrasound. *Phlebology*. 2013 Mar;28 Suppl 1:158-61.

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TEXT FOR INCLUSION IN THE DOCUMENT

DOMAIN 02, Statement 08, TOPIC: “**Ultrasound follow-up protocol after first DVT episode**”

Clinical thrombotic risk individual assessment is of paramount importance both in the general clinical patient management and in the ultrasound surveillance strategy definition. Apart the globally accepted indication of not repeating the scanning if its result is not going to change the therapeutic management, internationally validated algorithms defining the ultrasound surveillance timeline are missing and a significant risk of under/over scanning exams is present, together with the related healthcare organizational and economic burden.

Compression ultrasonography negative predictive value is over 97% indicating the need of repeated CUS testing within one week for a limited number of cases.

Over 20% of patients develops a post-thrombotic syndrome and/or a thrombosis recurrence at one year. Proper risk stratification and related ultrasound surveillance timeline planning should be customized to the specific patient scenario.

***[Michiels JJ, Moosdorff W, Maasland H, et al. Duplex ultrasound, clinical score, thrombotic risk, and D-dimer testing for evidence based diagnosis and management of deep vein thrombosis and alternative diagnoses in the primary care setting and outpatient ward. Int Angiol. 2014 Feb;33(1):1-19].**

Follow-up ultrasound assessment should be carefully planned in particular in patients with isolated calf vein thrombosis not undergoing anticoagulation and patients with recurrent signs and symptoms.

[Meissner MH. Duplex follow-up of patients with DVT: does it have clinical significance? Semin Vasc Surg. 2001 Sep;14(3):215-21].

Diagnostic management of deep venous thrombosis surveillance in patients already affected by a previous episode might be complicated by the possible persistent abnormal D-dimer levels, residual obstructions and high clinical risk predictors. Age-adjusted D-dimer compared to a fix cut-off value demonstrated to add reliability to the thrombo-embolic episode eventual identification.

[Righini M, Van Es J, Den Exter PL, et al. Age-adjusted D-dimer cutoff levels to rule out pulmonary embolism: the ADJUST-PE study. JAMA. 2014 Mar 19;311(11):1117-24].

Further difficulties in the best surveillance protocol definition have now been introduced by Covid pandemic which demonstrated to be associated with an increased deep venous thrombosis incidence. The need of ultrasound re-assessment has now to take this aspect into consideration.

[Pieralli F, Pomero F, Giampieri M, et al. Incidence of deep vein thrombosis through an ultrasound surveillance protocol in patients with COVID-19 pneumonia in non-ICU setting: A multicenter prospective study. PLoS One. 2021 May 20;16(5):e0251966].

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STATEMENT FOR PUBLIC EVIDENCE-BASED AWARENESS

Statement “after a deep venous thrombosis event a surveillance timeline should be tailored to the specific case.”

4 SELECTED REFERENCES

1. *Michiels JJ, Moosdorff W, Maasland H, et al. Duplex ultrasound, clinical score, thrombotic risk, and D-dimer testing for evidence based diagnosis and management of deep vein thrombosis and alternative diagnoses in the primary care setting and outpatient ward. *Int Angiol.* 2014 Feb;33(1):1-19.
2. Meissner MH. Duplex follow-up of patients with DVT: does it have clinical significance? *Semin Vasc Surg.* 2001 Sep;14(3):215-21
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identified LITERATURE BIAS

Heterogenous study population and outcome measures in the evaluated surveillance protocols

SUGGESTED NEXT LINES OF RESEARCH

Head to head comparison of different surveillance protocols