

EDITORIAL

Latest report from the ALTAMIRA study of emergency management of vein thrombosis: our departments' strengths and weaknesses

Estado actual del estudio de las trombosis venosas en los servicios de urgencias: fortalezas y debilidades

Joan Fité Matamoros

Deep vein thrombosis (DVT) and superficial thrombophlebitis (SVT), as part of venous thromboembolic disease, are of great importance due to their high prevalence, economic cost, and associated risks, essentially due to pulmonary thromboembolism (PTE) and its morbidity and mortality.¹ Prevalence rates of 1/1,000 persons/year are reported in Western countries. Regarding PTE, studies show a 25-30% mortality in cases not treated hyperacute, compared to 1-2% in early treatment cases.¹⁻³ The potential complications in the chronic phase impact the patient's health care cost and quality of life.^{1,4} Moreover, population ageing and other epidemiological factors predict an increase in the incidence of DVT/STE in the future.

Congestive symptoms and pain in the extremities are frequent causes of consultation in health care centers. The first approach is based on the direct or conceptual application of the Wells or Geneva criteria through anamnesis and physical examination.^{5,6} It is necessary to discern whether the symptoms are acute (there are scales to help discern between DVT and post-thrombotic syndrome⁷). When there is well-founded clinical suspicion, other studies are performed. There is much variation among published diagnostic algorithms. However, all of them are based on progressing to other tests only if clinical rationale is available in order to avoid excessive testing or referral to specialists (vascular surgeons or hematologists). In cases of high clinical suspicion, venous Doppler ultrasound should be performed (ideally by a specialist in angiology and vascular surgery).^{5,6,8,9} In fact, in cases of high suspicion and negative ultrasound, studies recommend initiating anticoagulant treatment and repeating the ultrasound in a few days by an expert explorer.^{10,11} In cases of intermediate clinical suspicion, D-dimer determination in the blood is associated as an adjunct.¹ However, D-dimer is not very specific, so some groups propose its interpretation by age and renal function to increase its sensitivity or use other biochemical markers.^{1,2,12,13}

The study published in this issue of EMERGENCIAS, entitled "Impact of emergency department management on the outcome of patients with isolated superfi-

cial venous thrombosis of the lower limbs. Subanalysis of the ALTAMIRA study", is based on a large, multi-center sample, with a geographic variation. This gives it representative validity of the actual care and therefore reinforces the conclusions of the work. A clear favorable aspect of the emergency department management is that patients were evaluated within a median of 4 days after the onset of symptoms. According to the evidence, this short time to assessment is crucial for reducing the incidence of long-term complications. Such speed is only assumed from an emergency department (ED) with free access for the patient since there is a usual delay in scheduled referrals.

In daily practice, evidence is often conditioned by logistics, a saturation of care and the availability of ultrasound or specialists. This explains the great variability of procedures between countries, between centers or even between patients at different times in the same center.⁴ Intending to resolve these problems, the working groups on venous thromboembolic disease are making progress in the integrated management of the pathology in the emergency department. The main associated measure is the formal training of emergency specialists in venous ultrasound. The literature shows short learning curves and acceptable parameters as the first link in the screening process.^{1,8,9}

In this regard, the present study shows an adequate discriminative capacity to detect SVT on ultrasound but indicates an intrinsic weakness in emergency department management of the disease, the performance of a simplified ultrasound: this does not show the details provided by a specialist ultrasound. It is possible that the training of emergency personnel does not allow complete venous ultrasound scans like those performed by specialists. These results make it reasonable to insist on continued personnel training in this field. Authors suggest that some details lost in this "simplified" ultrasound could have led to changes in the anticoagulation regimen prescribed in each case, reducing subsequent complications. The usual practice, when there is doubt or inconclusive evidence, is "preferential" referral to a specialist, initiating anticoagulation treatment immedi-

Author Affiliations: Angiology and Vascular Surgery, Hospital de la Santa Creu i Sant Pau - Universitat Autònoma de Barcelona, Spain.

Author Contributions: The author has confirmed his authorship in the author responsibilities document, publication agreement and assignment of rights to EMERGENCIAS.

Corresponding Author: Joan Fité Matamoros. Angiology and Vascular Surgery. Hospital de la Santa Creu i Sant Pau. Sant Antoni Maria Claret 167. 08025 Barcelona, Spain.

Email: JFite@santpau.cat

Article information: Received: 26-1-2023. Accepted: 1-2-2023. Online: 14-02-2023.

Editor in charge: Òscar Miró.

ately. This measure has a direct impact on the risk of PTE associated with hyperacute DVT/SVT, reducing potential mortality and legal complications.^{4,14} It is well described how EDs with integrated DVT management protocols have reduced programmed referrals to specialists, shortened waiting times for care and have provided a cost-efficient and safe practice for the patient.^{1,8} In this regard, the study highlights a high percentage (84.1%) of cases that received anticoagulation from the time of diagnosis in the ED. This percentage is encouraging, but contrasts with the absolute heterogeneity in the guidelines and complementary treatments prescribed. According to the available literature, suboptimal anticoagulation in terms of duration or dose, although started early, would justify the delay in the appearance of complications in the study cohort, but at 6 months the incidence of complications was significant (9.1%).

A foreseeable shortcoming of ED management is diagnostic error in atypical cases. This is associated with the lack of specialist expertise, both in the clinical management of DVT and in the performance of Doppler ultrasound (a highly explorer-dependent test).^{4,8,14} In these cases, there is a tendency to over-prescribe anticoagulants. This is reduced as the team's experience increases and seems to be an acceptable error given that the bleeding complications associated with these anticoagulation treatments are usually mild.^{3,13,14} The present study shows the unequivocal tendency to initiate early anticoagulation treatment when in doubt. The authors attribute the appearance of delayed complications to the fact that the patient has poor adherence to treatment, and this is undoubtedly a possible cause. However, the loss of subsequent follow-up of the patient should be considered as another factor directly predisposing to therapeutic noncompliance, and this loss of follow-up is a possible weakness in the management of DVT/SVT in the emergency department. Given the time of onset of complications in the study cohort, the authors suggest the need to prolong anticoagulant treatment more than usual, which seems even more justifiable if it is not known when there may be follow-up by a specialist. The absence of unified protocols leads to such heterogeneity in the anticoagulation guidelines given. As an alarming example, the study shows that only 1% of cases of SVT initiated anticoagulation with fondaparinux, which is the first-line treatment according to the best available evidence.

Certain comorbidities deserve special mention, such as the association between COVID-19 infection and a prothrombotic state. The persistent incidence of COVID-19 infections and the fact that the infection itself elevates circulating D-dimer levels make the usual management algorithms inapplicable.^{15,16} Some neoplasms and chronic inflammatory diseases are associated with venous thrombosis of atypical location, recurrent and with variegated semiology. This poses a major challenge for physicians who do not specialize in these diseases and more potential errors.^{10,13,17} Finally, mention should be made of distal DVT of the

lower limbs. These are small veins with anatomical variability, whose ultrasound examination is more complex and susceptible to error.^{13,18} It is possible that these assumptions explain part of the variability in the incidence of complications in the study, which seems too pronounced to be attributable only to variations in the anticoagulation regimen. It is interesting to note the finding in the study of factors associated with a higher risk of complication during follow-up (fever, need for nonsteroidal anti-inflammatory drugs (NSAIDs) in previous days). These could possibly be explained by the underestimation from the emergency department of non-inflammatory conditions that share pathogenic substrate with SVT/PVT and its more aggressive semiology. It may be virtually impossible to perform such a complete study in the ED to detect certain conditions that go undetected without very specific tests. Quite rightly, the authors propose the retrospective format as a limitation of their study in terms of the baseline characteristics of the cohort, and the need to identify cases of increased risk in which to be more aggressive with anticoagulation.

The management of DVT in the emergency department is a progressive trend that benefits both the patient and the health care system. The study confirms that rapid care of the DVT patient and early initiation of anticoagulation are essential to reduce long-term complications and improve quality of life. However, as the study shows, this approach still leads to a significant rate of complications during follow-up. Excessive variability in anticoagulation treatment is clearly shown, due to the lack of specific training and specific protocols for the management of SVT. Given these results, future efforts should be devoted to strengthening management circuits. Continuous training of all emergency personnel will lead to improved diagnostic reliability, and their formal training in venous Doppler ultrasound is essential. This will contribute to homogenize protocols and procedures to finally overcome the variability that still exists in the management of the disease.

Conflict of Interests Disclosure: None reported.

Funding/Support: The author declares the non-existence of funding in relation to the present article.

Ethical responsibilities: The author has confirmed the maintenance of confidentiality and respect for patient rights in the document of author responsibilities, publication agreement and assignment of rights to EMERGENCIAS.

Article commissioned and internally reviewed by the Editorial Committee.

References

- Bounameaux H, Perrier A, Righini M. Diagnosis of venous thromboembolism: An update. *Vasc Med*. 2010;15:399-406.
- Haines ST, Bussey HL. Diagnosis of deep vein thrombosis. *American Journal of Health-System Pharmacy*. 1997;54:66-74.
- Phillippe HM. Overview of venous thromboembolism. *Am J Manag Care*. 2017;23(20 Supl):S376-S382.
- Righini M, le Gal G, Bounameaux H. Venous thromboembolism diagnosis: Unresolved issues. *Thromb Haemost*. 2015;113:1184-92.
- Trihan JE, Adam M, Jidal S, Aichoun I, Coudray S, Laurent J, et al. Performance of the Wells score in predicting deep vein thrombosis

- in medical and surgical hospitalized patients with or without thromboprophylaxis: The R-WITT study. *Vasc Med*. 2021;26:288-96.
- 6 Grüne S, Orlik J, von Korn H, Schacherer D, Schlottmann K, Brännler T. Clinical signs in the diagnosis of deep vein thrombosis. *Int Angiol*. 2011;30:64-70.
- 7 Galanaud JP, Holcroft CA, Rodger MA, Kovacs MJ, Betancourt MT, Wells PS, et al. Comparison of the Villalta post-thrombotic syndrome score in the ipsilateral vs. Contralateral leg after a first unprovoked deep vein thrombosis. *J Thromb Haemost*. 2012;10:1036-42.
- 8 Sergent SR, Galuska M, Ashurst J. Management of deep vein thrombosis in the emergency department. *Emerg Med Pract*. 2020;22:1-24.
- 9 Wells PS. Integrated strategies for the diagnosis of venous thromboembolism. *J Thromb Haemost*. 2007;5(Supl 5):41-50.
- 10 Liederma Z, Chan N, Bhagirath V. Current challenges in diagnosis of venous thromboembolism. *J Clin Med*. 2020;9:3509.
- 11 Olaf M, Cooney R. Deep Venous Thrombosis. *Emerg Med Clin North Am*. 2017;35:743-70.
- 12 Gómez-Jabalera E, Bellmunt Montoya S, Fuentes-Camps E, Escudero Rodríguez JR. Age-adjusted D-dimer for the diagnosis of deep vein thrombosis. *Phlebology*. 2018;33:458-63.
- 13 Hansrani V, Khanbhai M, McCollum C. The diagnosis and management of early deep vein thrombosis. *Adv Exp Med Biol*. 2017;906:23-31.
- 14 Jiménez Hernández S, Ruiz-Artacho P, Maza Vera MT, Ortiz Villacian E, Chehayeb J, Campo Linares R, et al. Precisión, seguridad y eficiencia de la ecografía realizada por urgenciólogos en el diagnóstico de la trombosis venosa profunda en servicios de urgencias hospitalarios. *Emergencias*. 2019;31:167-72.
- 15 Rodríguez-Leal CM, García-Del-Salto L, Coperías JL, Sanmartín-Fenollera L, Fraga-Rivas P, Ruiz-Grinspan MS. Usefulness of D-dimer concentration in the diagnosis of pulmonary thromboembolism in patients with COVID-19 in the emergency department: estimating its discriminative capacity, sensitivity, and specificity. *Emergencias*. 2022;34:150-2.
- 16 Sebuhyan M, Mirailles R, Crichi B, Frere C, Bonnin P, Bergeron-Lafaurie A, et al. How to screen and diagnose deep venous thrombosis (DVT) in patients hospitalized for or suspected of COVID-19 infection, outside the intensive care units. *J Med Vasc*. 2020;45:334-43.
- 17 Zhang Y, Xia H, Wang Y, Chen L, Li S, Hussein IA, et al. The rate of missed diagnosis of lower-limb DVT by ultrasound amounts to 50% or so in patients without symptoms of DVT: A meta-analysis. *Medicine (Baltimore)*. 2019;98:e17103.
- 18 Kirkilesis G, Kakkos SK, Bicknell C, Salim S, Kakavia K. Treatment of distal deep vein thrombosis. *Cochrane Database Syst Rev*. 2020;4:CD013422.