



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

Triage of patients with venous and lymphatic diseases during the COVID-19 pandemic – The Venous and Lymphatic Triage and Acuity Scale (VELTAS):

A consensus document of the International Union of Phlebology (UIP), Australasian College of Phlebology (ACP), American Vein and Lymphatic Society (AVLS), American Venous Forum (AVF), European College of Phlebology (ECoP), European Venous Forum (EVF), Interventional Radiology Society of Australasia (IRSA), Latin American Venous Forum, Pan-American Society of Phlebology and Lymphology and the Venous Association of India (VAI)

Kurosh Parsi,^{a,b} Andre M. van Rij,^b Mark H. Meissner,^{a,c,d} Alun H. Davies,^e Marianne De Maeseneer,^f Peter Gloviczki,^g Stephen Benson,^b Oscar Bottini,^a Victor Manuel Canata,^a Paul Dinnen,^b Antonios Gasparis,^c Sergio Giancesini,^a David Huber,^b David Jenkins,^b Brajesh K. Lal,^c Lowell Kabnick,^a Adrian Lim,^b William Marston,^c Alberto Martinez Granados,^h Nick Morrison,^{a,d} Andrew Nicolaides,ⁱ Peter Paraskevas,^b Malay Patel,^a Stefania Roberts,^b Christopher Rogan,^{b,j} Marlin W. Schulz,^d Pedro Komlos,^k Andrew Stirling,^b Simon Thibault,^b Roy Varghese,^l Harold J. Welch,^c and Cees H. A. Wittens,^m *Amelia Island, Fla; Chicago, Ill; London, United Kingdom; Rotterdam, The Netherlands; and Rochester, Minn*

ABSTRACT

The coronavirus disease 2019 (COVID-19) global pandemic has resulted in diversion of healthcare resources to the management of patients infected with SARS-CoV-2 virus. Elective interventions and surgical procedures in most countries have been postponed and operating room resources have been diverted to manage the pandemic. The Venous and Lymphatic Triage and Acuity Scale was developed to provide an international standard to rationalise and harmonise the management of patients with venous and lymphatic disorders or vascular anomalies. Triage urgency was determined based on clinical assessment of urgency with which a patient would require medical treatment or surgical intervention. Clinical conditions were classified into six categories of: (1) venous thromboembolism (VTE), (2) chronic venous disease, (3) vascular anomalies, (4) venous trauma, (5) venous compression and (6) lymphatic disease. Triage urgency was categorised into four groups and individual conditions were allocated to each class of triage. These included (1) medical emergencies (requiring immediate attendance), example massive pulmonary embolism; (2) urgent (to be seen as soon as possible), example deep vein thrombosis; (3) semiurgent (to be attended to within 30-90 days), example highly symptomatic chronic venous disease, and (4) discretionary/nonurgent- (to be seen within 6-12 months), example chronic lymphoedema. Venous and Lymphatic Triage and Acuity Scale aims to standardise the triage of patients with venous and lymphatic disease or vascular anomalies by providing an international consensus-based classification of clinical categories and triage urgency. The scale may be used during pandemics such as the current COVID-19 crisis but may also be used as a general framework to classify urgency of the listed conditions. (*J Vasc Surg: Venous and Lym Dis* 2020;■:1-5.)

Keywords: COVID-19; Pandemic; SARS-CoV-2; Triage; Vascular; Venous; Lymphatic; Vascular anomalies; Vascular malformations

From the International Union of Phlebology (UIP)^a; the Australasian College of Phlebology (ACP)^b; the American Venous Forum (AVF), Amelia Island^c; the American Vein and Lymphatic Society (AVLS), Chicago^d; the Imperial College London, Charing Cross and St Mary's Hospital, London^e; the Department of Dermatology, Erasmus MC, Rotterdam^f; the Division of Vascular and Endovascular Surgery, Mayo Clinic, Rochester^g; the Pan-American Society of Phlebology and Lymphology^h; the European Venous Forum (EVF)ⁱ; the Interventional Radiology Society of Australasia (IRSA)^j; the Latin American Venous Forum^k; the Venous Association of India (VAI)^l; and the European College of Phlebology (ECoP).^m

Funding: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Author conflict of interest: The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: W.M. declared consultancy for Boston Scientific Inc. Other authors declared no relevant conflicts of interest.

This consensus document has been co-published in the *Journal of Vascular Surgery: Venous and Lymphatic Disorders* (doi: [10.1016/j.jvsv.2020.05.002](https://doi.org/10.1016/j.jvsv.2020.05.002)) and *Phlebology* (doi: [10.1177/0268355520930884](https://doi.org/10.1177/0268355520930884)). The publications are identical except for minor stylistic and spelling differences in keeping with each journal's style.

Correspondence: Kurosh Parsi, St. Vincent's Hospital Sydney, University of New South Wales (UNSW), Kensington, New South Wales 2052, Australia. (e-mail: kurosh.parsi@svha.org.au).

The editors and reviewers of this article have no relevant financial relationships to disclose per the Journal policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

2213-333X

Copyright © 2020 The Authors. Published by Elsevier Inc. on behalf of the Society for Vascular Surgery. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<https://doi.org/10.1016/j.jvsv.2020.05.002>

BACKGROUND

The global coronavirus disease 2019 (COVID-19) pandemic has resulted in diversion of healthcare resources including workforce, critical supplies, emergency and intensive care unit (ICU) facilities and personal protective equipment (PPE) to the management of patients infected with SARS-CoV-2 virus. Elective interventions and surgical procedures in most countries have been postponed and operating room resources have been diverted to manage the pandemic.¹ Limitations on direct personal contact and physical (social) distancing have influenced access to care and how it is provided. Patients with venous and lymphatic disorders or vascular anomalies continue to need expert care within current public health constraints. In addition, there is growing evidence that COVID-19 may predispose patients to both arterial and venous thromboembolic (VTE) disease and extensive coagulopathies further complicating the prognosis of the affected patients.²⁻⁴ To facilitate triage in this demanding setting we recommend the use of a standardised scale to rationalise and harmonise the management of these patients during this difficult period.

AIMS

The Venous and Lymphatic Triage and Acuity Scale (VELTAS) was developed to provide an international standard for the triage of patients with venous and lymphatic disorders or vascular anomalies. VELTAS aims to improve patient safety and increase triage reliability by providing a standardised framework for the management of these conditions.

METHODS

Stratification of triage urgency. Triage urgency is defined as the clinical assessment of urgency with which a patient would require medical treatment or surgical intervention.⁵ The principle for triage and prioritisation for admission for medical treatment or procedural interventions and surgery is based on the natural history and expected clinical outcomes of the condition, the rate of progression and deterioration, and the complications that may arise should treatment be delayed or withheld.⁶ The rationale for triage is 'to do the greatest good for the greatest number'.⁷

Various models and strategies for stratifying urgency during the COVID-19 pandemic have been proposed.⁸⁻¹⁰ In this document, the appropriate timeline to attend to individual conditions was determined by an international panel of vascular experts.

The consensus process. The project was initiated by the International Union of Phlebology (UIP) in conjunction with the Australasian College of Phlebology. The document was written by the primary authors and further

reviewed and developed by the co-editors, based on appraisal of current evidence in the literature published in print or online through April 2020. When evidence was lacking or limited, consensus was developed. The document was shared with an international expert panel of phlebologists and vascular specialists representing the endorsing societies and further topics and recommendations were included and the final document formulated. Consensus on triage and acuity was reached when a recommendation was unanimously supported by all authors. In case of any dissenting opinion multiple attempts were made to modify the recommendation. At the end of the consensus process, all participating authors approved the final version of the document and agreed to be accountable for all aspects of the work.

Utility and target audience. The scale is designed primarily for phlebologists and vascular specialists but will be also useful for primary physicians and general practitioners, referring doctors, emergency specialists and other healthcare professionals and health policymakers. VELTAS will be especially relevant during pandemics such as the current COVID-19 crisis but may also be used as a general framework to classify urgency of the listed conditions.

Scope. The scale includes a comprehensive range of conditions seen by phlebologists and other vascular specialists involved in the management of patients with venous and lymphatic disorders or vascular anomalies as defined by the UIP curriculum.¹¹

Recommendations. Clinical conditions within the scope of phlebology were classified into six categories of (1) VTE, (2) chronic venous disease (CVD), (3) vascular anomalies, (4) venous trauma, (5) venous compression and (6) lymphatic disease. Triage urgency in each clinical category was classified into four groups of (1) medical emergencies, (2) urgent, (3) semiurgent and (4) discretionary/nonurgent. Individual conditions in each clinical category were allocated to a class of triage by the expert panel (Table).

Adaptation to pandemic circumstances. We recognise that clinical practice and expectations need to be adapted in times of regional or global crisis. Under pandemic circumstances patients are encouraged to continue to consult their general practitioners and primary care physicians via appropriate means such as tele-health facilities to initiate management and to obtain a referral to phlebologists or other vascular specialists when necessary. During the pandemic, tele-health facilities should be used by treating specialists as much as possible to address patients concerns and provide advice on treatment options. Medical emergencies should continue to be triaged by emergency services where available.

Table. Venous and Lymphatic Triage and Acuity Scale (VELTAS)

Triage	Acuity	Priority	Clinical categories	Indications for medical treatment ^a or intervention ^b	
Medical emergency	Acute	Immediate	VTE	<ul style="list-style-type: none"> – Massive PE with or without DVT – Acute iliofemoral DVT with phlegmasia⁷ or sepsis – Acute ASVT with phlegmasia – Acute central vein thrombosis with superior vena cava syndrome – Acute MVT with peritonitis – Acute paradoxical embolism and stroke¹⁰ – Venous gangrene 	
	Life-threatening		CVD	<ul style="list-style-type: none"> – Life-threatening blood loss¹³ from a bleeding varix – Acute septicaemia or uncontrolled sepsis in a leg wound 	
	Potential for immediate deterioration		Vascular anomalies ^c	<ul style="list-style-type: none"> – Kasabach-Merrit syndrome with severe coagulopathy – Severe cardiac failure secondary to AVM 	
			Venous trauma	<ul style="list-style-type: none"> – Life or limb-threatening venous trauma¹⁰ 	
Category 1	Acute	As soon as possible	VTE	<ul style="list-style-type: none"> – PE,¹⁰ DVT, ASVT, MVT or extensive proximal SVT^{d 12,13} – DVT requiring IVC filter placement¹⁴ – Acute central vein thrombosis with or without haemodialysis access 	
			Urgent	CVD	<ul style="list-style-type: none"> – Temporarily controlled bleeding varices – Infected wounds and ulcers with risk of septicaemia – Squamous cell carcinoma in a venous ulcer
				Vascular anomalies ^c	<ul style="list-style-type: none"> – Acute complications including infection, bleeding and thrombosis – Cardiac failure secondary to AVM – Vascular malignancies
					Venous trauma
Category 2	May be chronic or new onset	Within 30-90 days	VTE	<ul style="list-style-type: none"> – Symptomatic nonextensive SVT^d – Removal of IVC retrievable filters¹⁴ 	
	Semiurgent	Initial management by the referring doctor	CVD	<ul style="list-style-type: none"> – CEAP¹⁵ C3–C6^e – Highly symptomatic CVD (irrespective of CEAP classification)^e – Highly symptomatic pelvic venous insufficiency, varicoceles^f 	
			Vascular anomalies ^c	<ul style="list-style-type: none"> – Complex or extensive vascular tumours and malformations – LIC within a vascular malformation or tumour – Ulceration and cutaneous complications 	
			Venous compression	<ul style="list-style-type: none"> – Highly symptomatic venous compression syndromes^f 	
Lymphatic disease	<ul style="list-style-type: none"> – Chronic lymphoedema with secondary infection or cutaneous changes 				

(Continued on next page)

Table. Continued.

Triage	Acuity	Priority	Clinical categories	Indications for medical treatment ^a or intervention ^b
Category 3	Chronic	Within 6-12 months	VTE	– Chronic symptomatic post-thrombotic obstruction
Discretionary/ nonurgent	No apparent potential to become an emergency	Initial management by the referring doctor	CVD	– CEAP C0 _s –C2 ^g – Mildly symptomatic pelvic venous insufficiency, varicoceles ^f
	Slow progression	Consider tele-interview	Vascular Anomalies ^c	– Uncomplicated benign vascular tumours and malformations
	Asymptomatic or mildly symptomatic		Venous compression	– Venous TOS – Mildly symptomatic venous compression syndromes including May–Thurner syndrome ^f
			Lymphatic disease	– Chronic lymphoedema or lipoedema

ASVT, Acute axillary subclavian vein thrombosis; AVM, arteriovenous malformation; CEAP, Clinical, Etiological, Anatomical, Pathophysiology classification; CVD, chronic venous disease; DVT, deep vein thrombosis; IVC, inferior vena cava; LIC, localised intravascular coagulopathy; MVT, mesenteric vein thrombosis; PE, pulmonary embolism; SVT, superficial vein thrombosis; TOS, thoracic outlet syndrome; VTE, venous thromboembolism.

^aMedical treatment started at admission may be continued in an outpatient setting.

^bIntervention can be performed in a nonhospital ambulatory or outpatient setting.

^cVascular anomalies incorporate two broad categories of vascular tumours such as haemangiomas and vascular malformations. The latter further includes venous (VM), arteriovenous (AVM), lymphatic (LM), capillary (CM), combined, complex and syndromic malformations in adults and children.

^dExtensive SVT is defined as above-knee great saphenous SVT ≥ 5 cm long whilst nonextensive SVT is defined as nonsaphenous SVT, below-knee saphenous SVT or above-knee saphenous SVT < 5 cm in length.

^eDuring pandemic circumstances, CVD should be initially managed in the community with a trial of medical treatments including compression therapy if appropriate; advice from vascular specialists to be obtained using tele-health technology where available.

^fThis indication excludes asymptomatic patients from triage categories and includes symptomatic patients only, as there is no current indication to intervene for asymptomatic May–Thurner syndrome, other venous compression syndromes or asymptomatic pelvic venous insufficiency.

Additional comments and exclusions.

- (1) This document should be used as a general guideline applicable to both hospital and nonhospital ambulatory settings.
- (2) Decisions regarding clinical urgency need to consider the patients' individual circumstances and loco-regional variations in the clinical practice of medicine, hospital policies and government-enforced guidelines and directives.
- (3) In developing VELTAS we recognise and acknowledge that some conditions:
 - (i) can be managed differently;
 - (ii) can be managed completely or in part by a variety of other healthcare providers;
 - (iii) are less urgent and hence can be managed more conservatively;
 - (iv) when chronic, can be safely delayed for definitive procedural interventions; and
 - (v) must be dealt with just as promptly despite the pandemic.
- (4) The scale does not replace the treating physician's clinical judgement of acuity and severity and the requirement for intervention as applicable in different models of healthcare.
- (5) The specified times for attendance indicate the ideal time frames within which patients should be seen and attended to. Such ideal timelines may be influenced by other factors such as availability of resources, other competing national or regional requirements for critical supplies and

PPE, and national, regional, local and individual hospital admission policies.

- (6) This document should not be used to delay or deny treatment of less urgent cases, deny or minimise reimbursement for services provided, or limit access to healthcare when resources are not limited, and such care does not present a risk to patients or health care workers.

CONCLUSIONS

VELTAS is a triage and acuity scale dedicated to the care of patients with acute and chronic venous and lymphatic disorders or vascular anomalies. The scale aims to standardise the triage of this group of patients by providing a consensus-based classification of clinical categories and triage urgency.

The authors thank the executive members of the endorsing societies for suggestions and revision of this document.

AUTHOR CONTRIBUTIONS

Conception and design: KP

Analysis and interpretation: KP, AvR, MM, AD, MDM, PG, SB, OB, VMC, PD, AG, SG, DH, DJ, BL, LK, AL, WM, AMG, NM, AN, PP, MP, SR, CR, MS, PK, AS, ST, RV, HW, CW

Data collection: Not applicable

Writing the article: KP, AvR, MM, MDM, PG

Critical revision of the article: KP, AvR, MM, AD, MDM, PG, SB, OB, VMC, PD, AG, SC, DH, DJ, BL, LK, AL, WM, AMG, NM, AN, PP, MP, SR, CR, MS, PK, AS, ST, RV, HW, CW

Final approval of the article: KP, AvR, MM, AD, MDM, PG, SB, OB, VMC, PD, AG, SC, DH, DJ, BL, LK, AL, WM, AMG, NM, AN, PP, MP, SR, CR, MS, PK, AS, ST, RV, HW, CW

Statistical analysis: Not applicable

Obtained funding: Not applicable

Overall responsibility: KP

KP and AvR participated equally and share co-first authorship.

REFERENCES

1. Diaz A, Sarac BA, Schoenbrunner AR, et al. Elective surgery in the time of COVID-19 [published online ahead of print April 16, 2020]. *Am J Surg*. <https://doi.org/10.1016/j.amjsurg.2020.04.014>.
2. Bikdeli B, Madhavan MV, Jimenez D, et al. COVID-19 and Thrombotic or thromboembolic disease: implications for prevention, antithrombotic therapy, and follow-up [published online ahead of print April 15, 2020]. *J Am Coll Cardiol*. <https://doi.org/10.1016/j.jacc.2020.04.031>.
3. Obi AT, Barnes GD, Wakefield TW, et al. Practical diagnosis and treatment of suspected venous thromboembolism during COVID-19 Pandemic [published online ahead of print April 17, 2020]. *J Vasc Surg Venous Lymphat Disord*. <https://doi.org/10.1016/j.jvsv.2020.04.009>.
4. Klok FA, Kruip MJHA, van der Meer NJM, et al. Incidence of thrombotic complications in critically ill ICU patients with COVID-19 [published online ahead of print April 10, 2020]. *Thromb Res*. <https://doi.org/10.1016/j.thromres.2020.04.013>.
5. Australian Institute of Health and Welfare. National definitions for elective surgery urgency categories: proposal for the Standing Council on Health. Canberra: AIHW; 2013.
6. MacCormick AD, Collecutt WG, Parry BR. Prioritizing patients for elective surgery: a systematic review. *ANZ J Surg* 2003;73:633-42.
7. Hartman RC. Tripartite triage concerns: issues for law and ethics. *Crit Care Med* 2003;31:S358-61.
8. Stahel PF. How to risk-stratify elective surgery during the COVID-19 pandemic? *Patient Saf Surg* 2020;14:8.
9. American College of Surgeons. COVID-19 Guidelines for triage of vascular surgery patients; 2020. Available at: <https://www.facs.org/covid-19/clinical-guidance/elective-case/vascular-surgery>. Accessed May 6, 2020.
10. Society for Interventional Radiology. COVID-19 case classification; 2020. Available at: <https://www.sirweb.org/practice-resources/toolkits/covid-19-toolkit/covid-19-case-classification/>. Accessed May 6, 2020.
11. Parsi K, Zimmet S, Allegra C, et al. Phlebology training curriculum. A consensus document of the International Union of Phlebology (UIP)-2010. *Int Angiol* 2010;29:533-59.
12. Decousus H, Quéré I, Presles E, et al. Superficial venous thrombosis and venous thromboembolism: a large, prospective epidemiologic study. *Ann Intern Med* 2010;152:218-24.
13. Scovell SD, Ergul EA, Conrad MF. Medical management of acute superficial vein thrombosis of the saphenous vein. *J Vasc Surg Venous Lymphat Disord* 2018;6:109-17.
14. Kaufman JA, Kinney TB, Streiff MB, et al. Guidelines for the use of retrievable and convertible vena cava filters: report from the Society of Interventional Radiology multidisciplinary consensus conference. *J Vasc Interv Radiol* 2006;17:449-59.
15. Lurie F, Passman M, Meisner M, et al. The 2020 update of the CEAP classification system and reporting standards. *J Vasc Surg Venous Lymphat Disord* 2020;8:342.

Submitted May 5, 2020; accepted May 7, 2020.