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)

This consensus document has been co-published in Phlebology [DOI: 10.1177/0268355520930884] and Journal of Vascular Surgery: Venous and Lymphatic Disorders [DOI: 10.1016/j.jvsv.2020.05.002]. The publications are identical except for minor stylistic and spelling differences in keeping with each journal's style. The contribution has been published under a Attribution-Non Commercial-No Derivatives 4.0 International (CC BY -NC-ND 4.0), (https://creativecommons.org/licenses/by-nc-nd/4.0/).

Kurosh Parsi1,2, Andre M van Rij2, Mark H Meissner1,3,4, Alun H Davies5, Marianne De Maeseneer6, Peter Gloviczki7, Stephen Benson2, Oscar Bottini1, Victor Manuel Canata1, Paul Dinnen2, Antonios Gasparis3, Sergio Gianesini1, David Huber2, David Jenkins2, Brajesh K Lal3, Lowell Kabnick1, Adrian Lim2, William Marston3, Alberto Martinez Granados8, Nick Morrison1,4, Andrew Nicolaides9, Peter Paraskevas2, Malay Patel1, Stefania Roberts2, Christopher Rogan2,10, Marlin W Schui4, Pedro Komlos11, Andrew Stirling2, Simon Thibault2, Roy Varghese12, Harold J Welch3 and Cees HA Wittens13

1International Union of Phlebology (UIP)
2Australasian College of Phlebology (ACP)
3American Venous Forum (AVF)
4American Vein and Lymphatic Society (AVLS)
5Imperial College London, Charing Cross and St Mary's Hospital, London, UK
6Department of Dermatology, Erasmus MC, Rotterdam, the Netherlands
7Division of Vascular and Endovascular Surgery, Mayo Clinic, Rochester, MN, USA
8Pan-American Society of Phlebology and Lymphology

9European Venous Forum (EVF)
10Interventional Radiology Society of Australasia (IRSA)
11Latin American Venous Forum (LAVF)
12Venous Association of India (VAI)
13European College of Phlebology (ECoP)

Corresponding author:
Kurosh Parsi, St. Vincent's Hospital Sydney, University of New South Wales (UNSW), Kensington, New South Wales 2052, Australia.
Email: Kurosh.Parsi@svha.org.au
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) semi-urgent (to be attended to within 30–90 days), example highly symptomatic chronic venous disease, and (4) discretionary/non-urgent- (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.

Keywords
COVID-19, pandemic, SARS-CoV-2, triage, vascular, venous, lymphatic, vascular anomalies, vascular malformations

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. 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. 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. 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. The rationale for triage is ‘to do the greatest good for the greatest number’.

Various models and strategies for stratifying urgency during the COVID-19 pandemic have been proposed. In this document, the appropriate timeline to attend to individual conditions was determined by an international panel of vascular experts.
### Table 1. Venous and Lymphatic Triage and Acuity Scale (VELTAS).

| Triage                      | Acuity                          | Priority            | Clinical categories | Indications for medical treatment\(^c\) or intervention\(^c\) |
|-----------------------------|---------------------------------|---------------------|---------------------|---------------------------------------------------------------|
| **Medical emergency**       | Acute                           | Immediate           | VTE                 | - Massive PE with or without DVT                              |
|                             | Life-threatening                |                     |                     | - Acute iliofemoral DVT with phlegmasia\(^9\) or sepsis       |
|                             | Potential for immediate         |                     |                     | - Acute ASVT with phlegmasia                                 |
|                             | deterioration                   |                     |                     | - Acute central vein thrombosis with superior vena cava       |
|                             |                                 |                     |                     | syndrome                                                     |
|                             |                                 |                     |                     | - Acute MVT with peritonitis                                  |
|                             |                                 |                     |                     | - Acute paradoxical embolism and stroke\(^10\)                 |
|                             |                                 |                     |                     | - Venous gangrene                                             |
|                             |                                 |                     |                     | - Life-threatening blood loss\(^10\) from a bleeding varix    |
|                             |                                 |                     |                     | - Acute sepsicaemia or uncontrolled sepsis in a leg wound     |
|                             |                                 |                     |                     | **CVD**                                                      |
|                             |                                 |                     |                     | - Kasabach–Merrit syndrome with severe coagulopathy           |
|                             |                                 |                     |                     | - Severe cardiac failure secondary to AVM                     |
|                             |                                 |                     |                     | - Infected wounds and ulcers with risk of sepsicaemia         |
|                             |                                 |                     |                     | - Squamous cell carcinoma in a venous ulcer                   |
|                             |                                 |                     |                     | **Vascular anomalies\(^c\)**                                  |
|                             |                                 |                     |                     | - Acute complications including infection, bleeding and       |
|                             |                                 |                     |                     | thrombosis                                                   |
|                             |                                 |                     |                     | - Cardiac failure secondary to AVM                            |
|                             |                                 |                     |                     | - Vascular malignancies                                       |
|                             |                                 |                     |                     | **Venous trauma**                                            |
|                             | Acute                           | As soon as possible  | VTE                 | - PE\(^1\), DVT, ASVT, MVT or extensive proximal SV\(^1\)    |
|                             | Potential to be life-threatening | Initial management   |                     | - 12, 13                                                      |
|                             | Potential to deteriorate         | may be provided by   |                     | - DVT requiring IVC filter placement\(^1\)                    |
|                             | quickly and may become an        | the referring doctor |                     | - Acute central vein thrombosis with or without haemodialysis|
|                             | emergency                       | Consider urgent      |                     | access                                                       |
|                             |                                 | tele-interview       |                     | **CVD**                                                      |
|                             |                                 |                     |                     | - Temporarily controlled bleeding varices                     |
|                             |                                 |                     |                     | - Infected wounds and ulcers with risk of sepsicaemia         |
|                             |                                 |                     |                     | - Squamous cell carcinoma in a venous ulcer                   |
|                             |                                 |                     |                     | **Vascular anomalies\(^c\)**                                  |
|                             |                                 |                     |                     | - Life or limb-threatening venous trauma\(^10\)               |
|                             |                                 |                     |                     | **Venous trauma**                                            |
|                             |                                 |                     |                     | - Non-life or limb-threatening venous trauma                  |
|                             |                                 |                     |                     | **Lymphatic disease**                                         |
|                             |                                 |                     |                     | - Lymphoedema with extensive lymphangitis or secondary         |
|                             |                                 |                     |                     | cellulitis and risk of sepsicaemia                           |

(continued)
| Category 2 | Acuity | Priority | Clinical categories | Indications for medical treatment<sup>a</sup> or intervention<sup>b</sup> |
|------------|--------|----------|---------------------|-------------------------------------------------|
| Semi-urgent| May be chronic or new onset | Within 30–90 days | VTE | Symptomatic non-extensive SVT<sup>d</sup> |
|            | Unlikely to become an emergency | Initial management by the referring doctor | CVD | Removal of IVC retrievable filters<sup>c</sup> |
|            | Unlikely to deteriorate quickly | Consider tele-interview | Vascular anomalies<sup>e</sup> | CEAP<sup>15</sup> C3–C6<sup>e</sup> |
|            | Highly symptomatic can cause significant pain, dysfunction or disability | | | Highly symptomatic CVD (irrespective of CEAP classification)<sup>e</sup> |
|            | | | | Highly symptomatic pelvic venous insufficiency, varicocoeles<sup>f</sup> |
|            | | | | Complex or extensive vascular tumours and malformations |
|            | | | | LIC within a vascular malformation or tumour |
|            | | | | Ulceration and cutaneous complications |
|            | | | | Highly symptomatic venous compression syndromes<sup>f</sup> |
|            | | | | Venous compression |
|            | | | | Lymphatic disease |
| Category 3 | Chronic | Within 6–12 months | VTE | Chronic symptomatic post-thrombotic obstruction |
| Discretionary/ non-urgent | No apparent potential to become an emergency | Initial management by the referring doctor | CVD | CEAP C0–C2<sup>e</sup> |
|            | Slow progression | Consider tele-interview | Vascular anomalies<sup>e</sup> | Mildly symptomatic pelvic venous insufficiency, varicocoeles<sup>f</sup> |
|            | Asymptomatic or mildly symptomatic | | | Uncomplicated benign vascular tumours and malformations |
|            | | | | Venous TOS |
|            | | | | Mildly symptomatic venous compression syndromes including May–Thurner syndrome<sup>f</sup> |
|            | | | | Lymphatic disease |

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.

<sup>a</sup>Medical treatment started at admission may be continued in an outpatient setting.

<sup>b</sup>Intervention can be performed in a non-hospital ambulatory or outpatient setting.

<sup>c</sup>Vascular 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.

<sup>d</sup>Extensive SVT is defined as above-knee great saphenous SVT ≥5 cm long whilst non-extensive SVT is defined as non-saphenous SVT, below-knee saphenous SVT or above-knee saphenous SVT <5 cm in length.

<sup>e</sup>During 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.

<sup>f</sup>This 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.
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.

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.

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) semi-urgent and (4) discretionary/non-urgent. Individual conditions in each clinical category were allocated to a class of triage by the expert panel (Table 1).
and such care does not present a risk to patients or health care workers.

Conclusion

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.

Declaration of Conflicting Interests

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

Funding

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

Acknowledgements

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

References

1. Diaz A, Sarac BA, Schoenbrunner AR, et al. Elective surgery in the time of COVID-19. Am J Surg. Epub ahead of print 16 April 2020, doi: 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. J Am Coll Cardiol. Epub ahead of print 15 April 2020. pii: S0735-1097(20)35008-7. doi: 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. J Vasc Surg Venous Lymphat Disord. Epub ahead of print 2020. doi: 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. Thromb Res. Epub ahead of print 10 April 2020. pii: S0049-3848(20)30120-1.
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 and Parry BR. Prioritizing patients for elective surgery: a systematic review. ANZ J Surg 2003; 73: 633–642.
7. Hartman RG. Tripartite triage concerns: issues for law and ethics. Crit Care Med 2003; 31: S358–S361.
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, https://www.facs.org/covid-19/clinical-guidance/elective-case/vascular-surgery (publication 24 March 2020; accessed 6 May 2020).
10. Society for Interventional Radiology. COVID-19 case classification, https://www.sirweb.org/practice-resources/toolkits/covid-19-toolkit/covid-19-case-classification/ (publication 8 April 2020; accessed 6 May 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: 533–559.
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: 218–224.
13. Scovell SD, Ergul EA and Conrad MF. Medical management of acute superficial vein thrombosis of the saphenous vein. J Vasc Surg Venous Lymphat Disord 2018; 6: 109–117.
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: 44945912.
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.