**Supplementary tables**

**Supplementary Table 1**: Hemodynamic profiles with associated echocardiographic findings

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| **Hemodynamic profiles** | **Echocardiographic Findings** |
| Severe hypovolemia | Small ventricles and atria  LV may be hyperkinetic if associated vasoplegia  Small IVC (< 15mm) with wide respiratory variations in spontaneously breathing patients (inspiratory collapse > 50%) |
| LV failure | Global LV systolic dysfunction (severity based on LVEF)  Heterogeneous contractility pattern suggestive of myocardial ischemia  LV cavity dilatation suggestive of chronic cardiac disease  Large IVC (> 23 mm) with decreased or absence of respiratory variations in spontaneously breathing patients (inspiratory collapse < 50%) |
| RV failure | RV dilatation (long-axis view of the heart) when RV/LV end-diastolic diameter > 0.6  Cor pulmonale if RV dilatation is associated with a paradoxical septal motion (short-axis view of the heart)  Large IVC (> 23 mm) with decreased or absence of respiratory variations in spontaneously breathing patients (inspiratory collapse < 50%) |
| Vasoplegia with hyperdynamic state | Hyperkinetic LV (estimated ejection fraction > 60%)  Near-obliteration of LV cavity at end-systole  May be associated with signs of hypovolemia (see above) |
| Tamponade | Compressive pericardial effusion on right cardiac cavities (inversion of the normal curvature of the free wall of initially the right atrium and subsequently the right ventricle)  Large IVC (> 23 mm) with decreased or absence of respiratory variations in spontaneously breathing patients (inspiratory collapse < 50%) |
| Severe left-sided valvular regurgitation | Massive color Doppler regurgitant flow (mitral or aortic regurgitation)  Preserved or increased LVEF and normal (non-dilated) LV cavity size are consistent with acute regurgitation |

Abbreviations: LV, left ventricle; RV, right ventricle; IVC, inferior vena cava; LVEF, left ventricular ejection fraction

**Supplementary Table 2**: Curriculum dedicated to emergency physicians for the use of focused echocardiography to hemodynamically assess patients presenting with acute circulatory failure

*Didactics (6 hrs)*

1. Ultrasound basics and image optimization, artifacts
2. Overview on the use of echocardiography in the Emergency Department
3. Standard cardiac ultrasound windows: parasternal long and short-axis views, apical four chamber view, subcostal four-chamber view, and IVC view
4. Echocardiographic patterns:

* LV global systolic function: normal or increased (hyperdynamic), depressed (visually estimated LV ejection fraction: 30% to 50%), or severely depressed (estimated LV ejection fraction < 30%)
* Homogeneous vs. heterogeneous LV contraction
* LV cavity size: normal, enlarged (based on the measurement of LV end-diastolic diameter in the parasternal views), or reduced (may be associated with [near] end-systolic obliteration in the short-axis view of the heart, or even in the long axis view)
* RV size: normal or dilated (ratio of RV/LV end-diastolic diameter measured in the long-axis view of the heart > 0.6); markedly dilated when RV/LV diameter > 1.0
* Paradoxical septal motion best identiﬁed in the parasternal short-axis view consistent with cor pulmonale
* IVC size: small (end-expiratory diameter < 15 mm), normal, or dilated (end-expiratory diameter > 23 mm) vessel
* Respiratory variations of IVC size in spontaneously breathing patients: collapsible vessel (visually assessed diameter reduction during inspiration > 50%) or non-collapsible vessel
* Identiﬁcation of pericardial ﬂuid and tamponade: pericardial effusion, collapsed (right) cardiac cavities (inversion of free wall curvature of the right atrium [sensitive] and subsequently of the right ventricle [specific]) and dilated non collapsible IVC
* Severe left-sided valvular regurgitation: criteria of severity using color Doppler mapping with adequate Nyquist limit settings (large width at the origin of the jet, large jet area within the left atrium [mitral regurgitation] or the left ventricle [aortic regurgitation]); associated findings consistent with acute regurgitation (preserved of increased LV ejection fraction, non-dilated LV cavity).

*Interactive clinical cases (3 hrs)*

* Overt hypovolemia
* Vasoplegia associated with hyperkinetic LV
* LV systolic dysfunction: moderate, severe, acute on normal heart, chronic on ischemic cardiomyopathy and on dilated cardiomyopathy
* RV systolic dysfunction: moderate, acute cor pulmonale
* Pericardial effusion (with differential diagnoses: epicardial fat, left pleural effusion, ascitis), tamponade physiology
* Acute severe mitral regurgitation, acute severe aortic regurgitation, as opposed mild-to-moderated left-sided regurgitation.

*Tutored hands-on (3 hrs)*

1. Examination of normal volunteers and mannequin: technical skills including probe handling, spatial orientation, imaging planes acquisition, and anatomical structure identiﬁcation
2. Operating information and machine settings
3. Tutored examination of patients with acute circulatory failure and abnormal echocardiography.

**Supplementary Table 3:** Characteristics of the study population at the time of focused echocardiography (n=114)

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| --- | --- | --- | --- |
|  | Study population | Patients excluded |  |
|  | n = 100 | n = 14 | *p-value* |
| Age (y) | 70±15 | 75±13 | *0.37* |
| Male | 62 (62) | 5 (36) | *0.06* |
| Diagnosis: |  |  |  |
| Sepsis | 28 (28) | 5 (36) | *0.54* |
| Septic shock | 27 (27) | 5 (36) | *0.49* |
| Other shock | 45 (45) | 4 (28) | *0.38* |
| Hemodynamic parameters: |  |  |  |
| Heart rate (bpm) | 100±25 | 98±26 | *0.65* |
| Mean blood pressure (mmHg) | 66±19 | 64±11 | *0.95* |
| Systolic blood pressure (mmHg) | 90±24 | 91±14 | *0.83* |
| O2 saturation | 96±4 | 92±5 | *0.01* |
| Fluid resuscitation\*, median [IQR] (mL) | 500 [187-1500] | 375 [0-500] | *0.44* |
| Biology: |  |  |  |
| pH | 7.31±0.15 | 7.37±0.09 | *0.18* |
| Lactate (mmol/L) | 5.2±4.9 | 3.3±1.9 | *0.32* |
| Creatinin (µmol/L) | 175±240 | 167±111 | *0.89* |
| Platelets (109 G/L) | 210±123 | 257±110 | *0.11* |
| Hemoglobin (g/dL) | 12.2±2.7 | 11.8±2.1 | *0.41* |
| Mean SOFA score | 5.0±3.1 | 4.4±2.6 | *0.43* |
| ICU admission | 32 (32) | 2 (14) | *0.22* |
| 28-days mortality | 36 (36) | 5 (36) | *0.98* |

Results are expressed as numbers or mean ± standard deviations. Numbers in parentheses are percentages.

\*: Volume of fluid administered at the time of focused echocardiography