Hemodynamic management of critically ill burn patients:

An International survey

1) Characteristics of your hospital:
   □ University hospital
   □ Public community hospital
   □ Private hospital
   □ Exclusive burn center
   □ Other, please specify: ..........................

2) Characteristics of your intensive care unit (ICU):
   □ Medical ICU
   □ Surgical ICU
   □ Mixed ICU
   □ Intensive care burn unit

3) Annual number of burns patients treated in the ICU (approximatively):
   □ ≥ 500 patients
   □ 200-500 patients
   □ 100-200 patients
   □ 50-100 patients
   □ < 50 patients
4) Total number of ICU beds (do not include medium care beds):
   □ > 20 beds
   □ 16-20 beds
   □ 11-15 beds
   □ 6-10 beds
   □ ≤ 5 beds

5) Number of ICU Beds devoted to burns patients (do not include medium care beds):
   □ > 20 beds
   □ 16-20 beds
   □ 11-15 beds
   □ 6-10 beds
   □ ≤ 5 beds

6) Your burned patients are:
   □ Only Adults
   □ Both children and adults
   □ Only children

7) Your main specialty (specialties) is (are): (More than one answer is possible)
   □ Intensive care
☐ Anesthesiology

☐ Surgery

☐ Other, please specify: .........................

8) In which country do you work?

..................................................

9) Experience in treating burn patients

☐ < 2 years

☐ Between 2 and 5 years

☐ >5 years

10) Do you work full time with burns patients?

☐ Yes ☐ No

11) Do you use a protocol for fluid resuscitation for burns patients in your unit?

☐ Yes ☐ No

12) Which formula do you use to start volume therapy on admission in your burn patients?

☐ Classical Parkland formula (4ml/Kg/% TBSA)

☐ Modified Parkland formula (2ml/Kg/% TBSA)

☐ Other formula, please specify: ..............................

☐ I do not use any formula
13) Do you routinely increase fluid volume resuscitation in the case of inhalation injury?

□ Yes  □ No

14) What parameters do you usually use to guide your volume therapy in severely burn patients in your unit? (In descending order of importance n°…..) (If you do not use any of them, leave it unchecked)

□ Urine output (n°……)

□ Mean arterial pressure (MAP) (n°……)

□ Central venous pressure/ Right atrial pressure (n°……)

□ Pulmonary capillary wedge pressure (PCWP) (n°……)

□ Global end diastolic volume (GEDV) / Intrathoracic blood volume (ITBV) (n°……)

□ Cardiac output (n°……)

□ Plasma lactate levels (n°……)

□ Plasma base deficit (n°……)

□ Central or mixed venous oximetry (ScvO2 or SvO2) (n°……)

□ Venous-to-arterial carbon dioxide difference (PCO2 gap) (n°……)

□ Pulse pressure variation (PPV) / Stroke volume variation (SVV) (n°……)

□ Echocardiography based parameters (n°……)

□ Skin mottling (n°……)

□ Extravascular lung water (EVLW) (n°……)

□ Other, please specify: ........................................ (n°……)
15) Do you usually (> 50% of cases) monitor cardiac output in the first 48 hours after admission in your severe burn patients?  
- Yes  \- No

16) If yes, which technique do you use to monitor cardiac output continuously?  
(More than one answer is possible)
- Oesophageal doppler probe
- Transpulmonary thermodilution
- Pulse contour analysis
- Pulmonary artery catheter
- Other, please specify:  ............................................

17) Do you use echocardiography to guide fluid resuscitation in your severe burn patients?  
- Yes  \- No

18) If yes, do you use:  (More than one answer is possible)
- Transthoracic Echocardiography
- Transesophageal Echocardiography
- Both

19) Which crystalloids do you use for the primary resuscitation in the first 48 hours?

<table>
<thead>
<tr>
<th>NaCl 0.9%</th>
<th>1) Almost never -</th>
<th>2) Rarely -</th>
<th>3) Sometimes -</th>
<th>4) Frequently -</th>
<th>5) Almost always -</th>
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<td><a href="http://www.NeurolinxConsulting.com">www.NeurolinxConsulting.com</a></td>
<td>Ringer’s Lactate</td>
<td>Plasma-Lyte®</td>
<td>Isofundine®</td>
<td>Other, please specify:</td>
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<td></td>
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Almost never (0 to 20 %), 2) Rarely (21 to 40%), 3) Sometimes (41 to 60%), 4) Frequently (61 to 80%), 5) Almost always (81 to 100%)

20) Do you use colloids?

| 1) Almost never □ | 2) Rarely □ | 3) Sometimes □ | 4) Frequently □ | 5) Almost always □ |

Almost never (0 to 20 %), 2) Rarely (21 to 40%), 3) Sometimes (41 to 60%), 4) Frequently (61 to 80%), 5) Almost always (81 to 100%)

21) Which colloids do you use for the primary resuscitation in the first 48 hours?

| HES | 1) Almost never □ | 2) Rarely □ | 3) Sometimes □ | 4) Frequently □ | 5) Almost always □ |

<p>| HES | 1) Almost never □ | 2) Rarely □ | 3) Sometimes □ | 4) Frequently □ | 5) Almost always □ |</p>
<table>
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<tr>
<th>Gelatins</th>
<th>1) Almost never □</th>
<th>2) Rarely □</th>
<th>3) Sometimes □</th>
<th>4) Frequently □</th>
<th>5) Almost always □</th>
</tr>
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<tr>
<td>Dextrans</td>
<td>1) Almost never □</td>
<td>2) Rarely □</td>
<td>3) Sometimes □</td>
<td>4) Frequently □</td>
<td>5) Almost always □</td>
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<td>Albumin 20%</td>
<td>1) Almost never □</td>
<td>2) Rarely □</td>
<td>3) Sometimes □</td>
<td>4) Frequently □</td>
<td>5) Almost always □</td>
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<tr>
<td>Albumin 5%</td>
<td>1) Almost never □</td>
<td>2) Rarely □</td>
<td>3) Sometimes □</td>
<td>4) Frequently □</td>
<td>5) Almost always □</td>
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<td>Fresh frozen plasma</td>
<td>1) Almost never □</td>
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<td>3) Sometimes □</td>
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HES= Hydroxyethylstarches

Almost never (0 to 20 %), 2) Rarely (21 to 40%), 3) Sometimes (41 to 60%), 4) Frequently (61 to 80%), 5) Almost always (81 to100%)

22) If you use colloids, how long do you wait before colloid infusion initiation?

- □ 6-8 hours after burn injury
- □ 12 hours after burn injury
- □ 24 hours after burn injury

23) If you use colloids, what are the triggers to initiate colloid infusion? (More than one answer is possible)

- □ Systematically 6-8 hours after burn injury
- □ Fixed total burned surface area (e.g. TBSA > 30%)
- □ Persistent hypotension (MAP< 65 mmHg)
- High cristalloid volume requirement
- Acute respiratory distress syndrome (ARDS)
- Low plasma albumin levels (< 25 g/L)
- Inhalation injury
- Decreased urine output (< 0.5 ml/Kg/h)
- Other: ..........................................................

24) Do you use adjunctive therapies to reduce volume administration in the first 48 hours after burn injury? (More than one answer is possible)
   - I use vasopressors early
   - I use high dose Ascorbic acid (Vitamin C)
   - I use early skin grafting surgery (<48 hours)
   - I use corticoids
   - Other, please specify: ....................................

26) What is your first line vasopressor in the initial treatment of your severe burn patients?
   - Dopamine
   - Norepinephrine
   - Epinephrine
   - Phenylephrine
   - Vasopressin
   - Metaraminol
   - Other: .............................................
27) Which MAP do you generally target in a young severely burned patient without comorbidities?

- 60 mmHg
- 65 mmHg
- 70 mmHg
- 75 mmHg

28) Which Cardiac index (CI) do you generally target?

- 2-2.5 L/min/m²
- 2.5-3 L/min/m²
- 3-3.5 L/min/m²
- > 3.5 L/min/m²
- I consider CI variations rather than a specific number

30) Do you use vasodilators in the first 24 hours after burn injury?

1) Almost never □  2) Rarely □  3) Sometimes □  4) Frequently □  5) Almost always □

Almost never (0 to 20%), 2) Rarely (21 to 40%), 3) Sometimes (41 to 60%), 4) Frequently (61 to 80%), 5) Almost always (81 to 100%)

31) If yes, which vasodilators do you use for the primary resuscitation in the first 24 hours?

- Nitroglycerin
- Dobutamine
- Enoximone
- Prostacyclin
- Pentoxifylline,
- Other: __________________________