Patients Characteristics

34 critically ill patients with multiple organ failure (MOF) and a median SOFA-Score of 17, resulting in an expected mortality rate > 80%

<table>
<thead>
<tr>
<th>Main admission diagnosis</th>
<th>47% Septic Shock</th>
<th>26% ARDS</th>
<th>15% Liver failure</th>
<th>12% Cardiogenic Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver failure at the 1st ADVOS treatment</td>
<td>56% acute liver failure: 44% acquired, 9% post-transplant, 3% primary; 44% acute-on-chronic liver failure (ACLF)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indication for renal replacement therapy (RRT)</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>76%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vasopressors</td>
<td>73%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ADVOS treatment

- Therapy goal:
  - Correction of severe metabolic derangement
  - Fluid removal during anuria
  - Correction of hyperkalemia and/or uremic complications
- 102 treatments were performed, with a median of 2 (IQR: 1-9) treatments/patient and a median duration of 17.5 hours (IQR: 11-23)
- Treatment parameters:
  - Median blood flow: 100 ml/min
  - Median concentrate flow: 160 ml/min
  - Median dialysate pH: 8.3
- Anticoagulation:
  - Regional citrate anticoagulation (CiCa): 44%
  - Unfractionated Heparin (UFH): 43%
  - Antithrombin III (AT III): 10%
  - No Anticoagulation: 3%

Performance

- Median removal rate of ADVOS multi*: Bilirubin: 17.0%, Creatinine: 7.1%, BUN: 17.6%, Ammonia: 16.4%
- Significant improvements:
  - Patients with ARDS:
    - Blood pH increased from 7.21 to 7.40
    - pCO₂ decreased from 68.8 to 49.5 mmHg
  - Patients with severe metabolic acidosis:
    - Blood pH increased from 7.19 to 7.40
    - Bicarbonate increased from 15.4 to 20.4 mmol/l
    - Base excess increased from -12.4 to -4.9 mmol/l

Safety

- Treatments were well tolerated.
- A non-significant reduction of platelets was observed.
- Bleedings were observed in 3 patients with ACLF grade III. None of these appeared to be related to ADVOS treatment.

Outcome

- Median length of the ICU stay: 9 days (IQR: 3–22)
- 28-day mortality rate: 50%
- 90-day mortality rate: 62%

Conclusion

- A lower mortality rate than expected could be observed in patients with advanced stages of MOF treated with the ADVOS multi.
- The number of adverse events was comparable to other studies assessing conventional RRTs in critically ill patients.

Our opinion

- The ADVOS therapy offers liver, lung, and kidney support together with acid-base-balance correction and CO₂ removal in one single device.
- This approach seems to be clinically very meaningful, especially for patients with multiple organ failure.
- Individual detoxification functions of the ADVOS device contribute to the overall detoxification of the patient.

*The reduction rate was concentration dependent and higher during the first treatment.