High convection volumes in on-line haemodiafiltration: Do we know what we prescribe?

Ficheux A1, Gayrard N1, Duranton F1, Guzman C1, Arglès A1,2, *

1. RD – Néphrologie and EA7288 Groupe Rein et HTA, University of Montpellier, France
2. Néphrologie Dialyse St Guilhem, Sète, France

Background

Randomized controlled trials suggest that on-line haemodiafiltration (OLHDF) improves survival, provided that it reaches high convective volumes (1). However, there is scant information on the consequences of modifying convection volumes in vivo.

Objectives

To study the consequences of modifying convection volume in on-line HDF in vivo.

Methods

Twelve stable dialysis patients were sequentially treated with XEVONTA 1.8 and 2.3 m², polysulphone dialyzers with different convection flows (QUF) guided by individual k_{UFR–max} values (2) for 1 week each:

- HD (QUF = weight loss),
- k_{UFR–max} (global ultrafiltration coefficient of a dialysis setting),
- 40% under k_{UFR–max} settings
- 40% over k_{UFR–max} settings (limited by a ratio QUF/Qblood at max 30%)

Physiology of dialysis

Overall convection volumes obtained with the 1.8 m² dialyzer were 3.1±0.2 L/session in HD (weight loss), 12.9±0.2 at Quf under, 20.6±0.4 at k_{UFR–max} and 24.5±0.6 L/session at QUF over and were slightly greater with the 2.3 m² surface (table).

Mean TMP significantly increased with convection, particularly with the 1.8 m² (table), frequently resulting in alarms (table).

Table. Dialysis characteristics according to QUF condition and surface area

<table>
<thead>
<tr>
<th>Surface area</th>
<th>QUF condition</th>
<th>Convolution volume (L)</th>
<th>Mean TMP (mmHg)</th>
<th>Proportion of achievement of QUF of GKD-UF–max (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD</td>
<td></td>
<td>3.1±0.2</td>
<td>75±1</td>
<td>&gt;20%</td>
</tr>
<tr>
<td>Under k_{UFR–max}</td>
<td></td>
<td>3.6±0.2</td>
<td>80±0.6</td>
<td>0%</td>
</tr>
<tr>
<td>Over</td>
<td></td>
<td>3.5±0.3</td>
<td>85±0.7</td>
<td>10%</td>
</tr>
<tr>
<td>QUF</td>
<td></td>
<td>3.6±0.2</td>
<td>90±0.8</td>
<td>30%</td>
</tr>
<tr>
<td>P-value</td>
<td></td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Results

Prescription achievement

TMP over 300 mmHg was corrected with a reduction of QUF. Consequently, prescribed convection volume was not achieved in all treatments (only in 33% of the ‘over’ treatments with 1.8 m² dialyzer, table), while this was significantly improved with the larger dialyzer (figure 2).

Conclusions

Setting an OL-HDF system at the QUF of k_{UFR–max} resulted in high convection volumes as recommended by the recent RCTs (>20L).

Beyond k_{UFR–max} the instability of the system provoked alarms, rarely achieved the prescribed convection volumes and increased albumin loss.

Using a 2.3 m² dialyzer reduced the number of alarms but further increased albumin loss.

Dialysis efficacy

Convection enhanced removal of middle molecules of higher mol weight (figure 4) and total removal, particularly with 2.3 m².

References


Acknowledgments

BBraun-AvItum and RD-Néphrologie participated in the fees generated to perform the study. This work has been possible with the involvement of Aurélie Laden, Sylvie Febbraro, Marie Thomas, Gilles Gioubert, Christel Baux and the nursing and secretarial staff of NDSG.