In vivo and in vitro Evaluation of Disposable Membrane Envelopes for a Kiil Dialyser

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The performance of Kiil dialysers has been shown to be improved by the use of secondary membrane support structures.

Disposable, pre-sterilised membrane envelopes embodying a fine nylon mesh support on the dialysis fluid side of the membrane were found not only to improve dialysance performance, but to reduce the preparation time considerably. The envelopes manufactured by Staynes Laboratories Ltd, were compared with standard 12 micrometre cross grained Cuprophane membranes both in vivo, and in vitro, using Watson Marlow Kiil dialysers.

With the introduction of a secondary membrane support structure the following characteristics were observed:

![Graph showing dialysance performance](image)

**Figure 1.** Comparative in vivo urea dialysance
Mean curves obtained by least squares approximation of experimental data and are shown with 95% confidence limits.

![Graph showing dialysate flow with blood flow](image)

Figure 2. Comparative in vivo creatinine dialysance

(a) Increased in vivo dialysance (Figures 1 and 2). The observed increases were further confirmed by the in vitro results.

(b) Increased mean dialysate blood compartment pressure drop from 56 mm Hg to 80 mm Hg at a flow rate of 200 ml/min.

(c) Unchanged ultrafiltration rates of 5.5 ml/min at a net membrane pressure of 150 mm Hg.

(d) Unchanged membrane distension characteristics even at high transmembrane pressures.

(e) Increased residual blood volumes (Table I) but still within the accepted limits for regular dialysis treatment.

### Table I. Residual Blood Volume Characteristics

<table>
<thead>
<tr>
<th>Number of observations</th>
<th>Mean saline* washback (ml)</th>
<th>Mean residual blood volume (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard membrane</td>
<td>9</td>
<td>758</td>
</tr>
<tr>
<td>Bier Staynes Insert</td>
<td>9</td>
<td>743</td>
</tr>
</tbody>
</table>

*Measured by weighing Saline bottle before and after washback

REFERENCES
