THE ENCLOSED TWIN COIL KIDNEY
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The enclosed coil is a standard twin coil sheathed in plastic film like the minicoil (Figure 1). Dialysis fluid is passed through the coil once and discarded. Its priming volume and resistance to flow are similar to those of the standard twin coil and it is designed for the same purpose — the treatment of acute renal failure by intermittent dialysis. Its advantages over the usual arrangement of the twin coil are:

1. Dialysis fluid can be pumped from a single tank to the bedside in several adjacent cubicles. The room illustrated is one of four being equipped in this manner. The only other equipment required at the bedside (using systemic heparinisation) are a small blood pump and manometer.

   It is no longer necessary to break barrier nursing routine by removing the patient to a dialysing room, which is used by other infected patients.

2. Dialysis fluid with its bacterial population is not exposed to the atmosphere of the cubicle. Bacterial growth in dialysis fluid is less rapid than in the usual system using recirculation.

EFFICIENCY OF THE ENCLOSED TWIN COIL

As a basis for comparison the standard Baxter-Travenol coil was studied in its usual situation in the Travenol kidney. The coil was sealed efficiently in the holding-can by a narrow pneumatic cuff. Urea, creatinine and urate dialysance were measured at varying blood flow rates during 11 haemodialyses at 37°C (Figures 2, 3). Blood flow was measured with an EMACK electromagnetic flowmeter and dialysance calculated from inflow-outflow difference in blood concentration. A correction was applied for bath water concentration, which was always low. Much of the scatter of results (Figure 2) is due to variation between individual coils.

Baxter-Travenol coils were encased in plastic (PVC) by the Department of Surgery, Newcastle upon Tyne. During 7 haemodialyses at 37°C, urea, creatinine and urate dialysance were measured as above. At each blood flow rate several observations were obtained at different rates of flow of dialysis fluid. The results were compared with average dialysance at that blood flow with the standard twin coil (Figure 2). The same variation between individual coils was found as in Figure 2, but for a given coil there was little difference between the dialysis fluid flow rate required at different blood flows (range 100-410 ml./min.). The results of all observations have therefore been averaged in Figure 4.

At a dialysis fluid flow rate of 1 litre per minute the enclosed coil has a urea dialysance about 86% that of the standard coil. However since the latter loses some efficiency because of accumulation of urea in the bath water, and because of time lost during bath changes, their overall efficiency is very similar.

The following example is calculated from the formulae of Wolf et al. (1951), assuming a patient with 40 litre body water and a steady blood flow of 300 ml./min.

*From the Royal Victoria Infirmary and Department of Medicine, Newcastle upon Tyne.
<table>
<thead>
<tr>
<th></th>
<th>Average urea clearance (ml./min.)</th>
<th>Dialysis fluid used in 6 hours (litres)</th>
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</thead>
<tbody>
<tr>
<td>Standard coil</td>
<td>142</td>
<td>300</td>
</tr>
<tr>
<td>2-hourly bath change</td>
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<td></td>
</tr>
<tr>
<td>5 minute changeover</td>
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<td></td>
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<tr>
<td>Enclosed coil</td>
<td>140</td>
<td>360</td>
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REFERENCES

Figure 1. The enclosed twin coil kidney.

Figure 2. Urea dialysance of Standard Twin Coil. Seventy six observations on 11 coils. The mean result indicated by the graph is similar to that obtained by Shaldon et al. (1964) using Capon Heaton coils and the same pneumatic seal.

Figure 3. Urea, Creatinine and Urate Dialysance of Standard Twin Coil. Mean results derived from 76 observations on 11 coils.

Figure 4. Urea Dialysance of Enclosed Twin Coil. The dialysance is expressed as a percentage of that obtained with the standard twin coil at the same blood flow (Figure 2). The results for creatinine and urate are very similar. Mean of 70 observations on 7 coils.