A NEW LOW COST SINGLE PATIENT PROPORTIONATING AND MONITORING SYSTEM FOR HAEMODIALYSIS

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This prototype (Fig. 1), which was built by Joseph Lucas Group Research Centre, is designed primarily for home dialysis but also offers many advantages for hospital use. By integrating a dialysate proportionating system, full dialysis monitoring and blood and heparin pumps,

Fig. 1. General view of machine, set up with Twin Minicoil Artificial Kidney.
Fig. 2. A patient and her husband using the machine in hospital during training for home dialysis.

all the facilities for haemodialysis have been provided in one compact unit. It has been in use for the last three months with the Twin Minicoil Artificial Kidney (Simpson, Robson, Blainey and Dawson-Edwards, 1965) but is equally suitable for use with the Kiil dialyser. A patient has now been trained, with her husband, for home dialysis using this machine (Fig. 2) and the new 150 P.T. Cupraphane Twin Minicoil Artificial Kidney (Simpson, Blainey, Dawson-Edwards, Hilton and Williams, 1966).

The following facilities are provided:

1. Continuous production of dialysate at 500 ml/min from a X 35 liquid concentrate and cold tap water by a fixed ratio mechanically interlocked proportionating pump with a dilution of accuracy better than ±1%.

2. Heating of dialysate to 38°C or any predetermined temperature.

3. De-aeration of warmed dialysate.

4. Continuous monitoring of dialysate, conductivity and temperature with an alarm and automatic bypass of the dialysate from the dialyser in the event of a deviation beyond preset limits. The conductivity meter is compensated for variations in tap water and batches of concentrate using a standard solution prepared by dilution of the particular batch in use with the local tap water.

5. A header tank for dialysate supply, a dialysate flow meter, a dialysate effluent pump and check valves, to control dialysate flow and negative pressure.

6. Monitoring of dialysate negative pressure with alarm and automatic cut-out of dialysate effluent pump in the event of a deviation beyond preset limits (Baillod, Comty, Ilahi, Konotey-Ahulu, Sevitt and Shaldon, 1965).

7. A roller type blood pump for use when required.

8. Monitoring of venous return bubble trap pressure with alarm and cut-out of blood pump in the event of a deviation beyond preset limits (Baillod et al., 1965).

9. Manual restart of dialysate effluent pump and blood pump by pressing an appropriate reset button after an alarm situation (Baillod, Shaldon and Ramalingum, 1965).

10. Blood leak monitor in the dialysate effluent line with alarm, automatic bypass of dialysate
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from dialysate and cut-out of blood and dialysate effluent pumps in the event of a blood
to dialysate leak greater than 1 in 5,000.
11. Roller type heparin pump for continuous heparinisation.

To operate the machine all that is required is a 13 amp. 240 volt. power supply, a cold
water tap and a drain. All the circuitry is fail safe and the control panel has been designed as
simply as possible. Throughout the design simplicity and reliability have been the keynote.

Sterilisation is achieved by pumping 10% formalin solution through the concentrate line
at the end of dialysis for 30 minutes. This is washed out with water for one hour prior to
pumping concentrate before the next dialysis.

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