

A Haemodialysis System with Continuously Regulated Negative and Positive Pressure

M MEBEL, D STRANGFELD, K BUCHALI,
W DUTZ, M SCHEEL and Th ERDMANN

IIInd Medical Clinic Charité and Krankenhaus Friedrichshain,
Berlin, German Democratic Republic

The elimination of the waste products and the regulation of the water balance in chronic uraemic patients are the main problems in dialysis treatment. Therefore investigations were done to make dialyzers more effective. Recently, a new membrane 'Nephrophan' was introduced for these purposes. It is more effective than cuprophane, but its use in the existing dialyzers is complicated by a high ultrafiltration rate.

The 'single pass' dialysis system demonstrated overcomes these disadvantages, ultrafiltration is variable between 30 and more than 700 ml/h. The system consists of two air tight encapsulated coils arranged in parallel flow for blood and dialysis fluid. The dialysis fluid is sucked through the

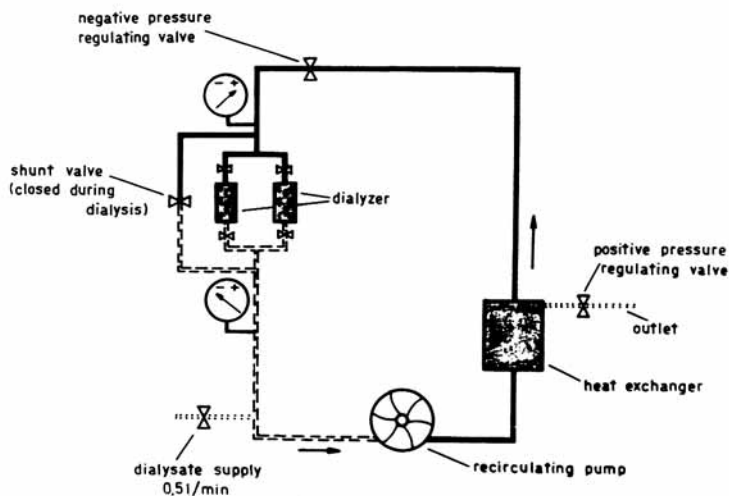


Figure 1. Haemodialysis system with continuously regulated negative and positive dialysate pressure

coils with a speed of 30 l/min. The pressure of dialysis fluid can be varied from +300 to -300 mm Hg continuously by two valves in the closed circuit. One safety valve controls the positive pressure, built up by the pump, the second one serves for the production of a negative pressure at the outflow of the coils. The coils are wound with Nephrophan, 2.7 m length each, the total area is 0.7 m². Urea dialysance is 150 ml/min at a blood flow of 200 ml/min. The priming volume of the coils is 240 ml at a pressure of 100 mm Hg. The parallel arrangement of the coils enables the exchange of one coil without interruption of the dialysis treatment by special valves at the entrance and the exit of each coil. A shunt parallel to the coils avoids abrupt rises of the dialysate pressure whilst starting the dialysis pump or exchanging one coil.

Using this system, more than 3,000 dialysis treatments have been done.