The major medical problems associated with home haemodialysis have been the recurrent complications of clotting, haemorrhage, infection and emergency surgery associated with the external shunt. In order to eliminate these problems and thereby permit a greater availability of home dialysis the internal A/V fistula has been used instead of the external shunt for home dialysis.

Since October 1967, 12 patients (8 males, 4 females), have been trained to use an internal A/V fistula in the home overnight. The A/V fistula has been created between the radial artery and cephalic vein, but was not used for at least 4 weeks. Three patients were trained to insert the needles them-
Figure 2. Blood enters the tube as needle penetrates the vein.

Figure 3. Heparin is injected by the patient before he connects himself to the dialyzer.

selves (Figures 1 - 3) and in 8 cases the spouse was taught the art of needling. In 1 patient the local doctor inserts the needles. Total experience of this technique is 6.0 patient years.

All patients are initially trained on an external shunt before transferring to the internal fistula, and have unanimously expressed a preference for the
internal fistula. No significant problems have occurred with the fistula to date. The use of the blood pump has not produced haemolysis, and with more reliable blood flows using the K31 dialyzer 3 to 4 times a week, higher haematocrit levels have been achieved (average 30, range 23 to 48), without the use of a single blood transfusion.

The safe use of a blood pump overnight in the home has been achieved by incorporating (1) a complete de-aeration of the dialysate; (2) the introduction of a collapsible totally sealed vacuum monitor between the outflow needle and the blood pump to prevent suction on the vein wall, and subsequent air embolus; and (3) a level detector for air in the venous bubble trap. These two monitors have been designed on a fail-safe basis, and incorporate in addition a remote speed control for the blood pump which can be patient operated.

Other monitors for conductivity and temperature of dialysate, a blood leak detector, vacuum pressure gauge and optical fail-safe venous pressure gauge, together with flexible control of dialysate sodium and automatic heat sterilization are all incorporated in an automated monitoring and dialysate supply unit. A new machine incorporating fistula monitoring as well as the latter monitoring systems is now under development.
PART III

REGULAR DIALYSIS TREATMENT

Chairman: Professor J. H. Thaysen