

# Continuous Ambulatory Peritoneal. Dialysis United Kingdom Experience

R. GOKAL, J. RAMOS, M. K. WARD and D. N. S. KERR.

Departments of Renal Medicine. Manchester Royal Infirmary and Royal Victoria Infirmary, England.

## SUMMARY

For historical and strong economic reasons in U. K. the acceptance rate of new patients onto dialysis by 1980 was very low. At this moment CAPD seemed to have provided an outlet for these limited HD facilities. So for currently there are nearly 1,000 patients managed on CAPD in U. K. The technique is practiced in about 95 % of all renal units, and the patients account for about 20 % of the total dialysis population. This rapid expansion has had its problems. The drop-out rate at 1 year is about 50 % (including transplantation) and the main cause of failure is peritonitis.

In Newcastle-upon-Tyne 122 patients were managed on CAPD along 3 years. Eighteen patients were transplanted while 19 of the 33 failures were due to peritonitis. The actuarial patients survival was 80 % at 2 years, while the actuarial technique survival, corrected for those patients transplanted was 63 % at 2 years.

The high drop-out rate in the U. K. overall experience may be due to the practice of the technique in a number of units without adequate nursing/medical staff or an appropriate area. In units with good experience the figures are acceptable but still inferior to the technique survival of HD.

It is concluded that for best results CAPD should be undertaken as part of are integrated dialysis and transplant programme.

Key words: CAPD, Survival on CAPD.

## RESUMEN

Por razones históricas y económicas el ritmo de inclusión de nuevos pacientes en programa de diálisis en el Reino Unido ha ido disminuyendo hasta alcanzar en 1978 los 20/millón de habitantes/año.

En estas fechas la introducción de la DPCA parecía capaz de proporcionar una salida a la limitación de puestos de HD, por lo que se produjo una rápida expansión de la técnica, hasta el punto de ser realizada por el 95 % de las unidades renales y aplicarse al 20 % de la población en diálisis (1.000 pacientes) en los años 81-82. Tan sorprendente crecimiento pudo ser la causa de un elevado índice de fracasos de la técnica: sólo un 50 % de los pacientes continuaban al final del primer año en DPCA.

En Newcastle-upon-Tyne, con 122 casos y 3 años de experiencia, los resultados son mejores, arrojando unas cifras de supervivencia actuarial de pacientes a 2 años del 80 %, con un 63 % de supervivencia en la técnica (corregida para trasplantados) al final del mismo periodo de tiempo.

De este grupo de 122 pacientes, 18 fueron trasplantados y 33 más habían abandonado DPCA al final del tercer año, considerándose como fracasos de la técnica. De ellos, 19 salieron de programa por peritonitis.

Se concluye que, en general, la DPCA proporciona una adecuada calidad de vida con sensación de bienestar y libertad. No obstante, debe ser asumida como parte de un programa integrado de diálisis y trasplante y dirigida por personal médico y de enfermería adecuadamente preparado, usando áreas hospitalarias específicas.

Palabras clave: DPCA, supervivencia en DPCA.

NK  
30% 1<sup>a</sup>A  
No. de pacientes  
H. Cerrillo  
60% 2<sup>a</sup>A  
(Newcastle)

Since its first inception in 1976 by POPOVICH et al.<sup>1</sup>, CAPD has gained increasing acceptance as a primary form of dialysis treatment in the management of patients with end stage renal failure. This treatment was introduced into the U. K. towards the end of 1978. Since then there has been a remarkable rise in the use of CAPD in the ensuing 3 years.

**DIALYSIS TREATMENT IN THE U. K.**

For historical and strong economic reasons the renal replacement treatments of choice have been home haemodialysis and transplantation. In 1970, 62 % of the haemodialysis population was home based<sup>2</sup>. The use of intermittent peritoneal dialysis was very limited and employed in a few units only. Because of this policy and lack of hospital or in centres haemodialysis facilities, the acceptance rate of new patients onto dialysis was 20/million/population/year, well below half the expected rate of those aged 15-55 without system diseases.

CAPD seemed to have provided an outlet for these limited HD facilities and a ready way of expanding dialysis and increasing the acceptance rate. So for the ensuing 3 years this technique grew rapidly and exceeded the rate of increase of both haemodialysis and transplantation. Currently there are nearly 1,000 patients managed on CAPD in the U. K., where the technique is practiced in about 95 % of all renal units and CAPD patients account for about 20 % of the total dialysis population.

However, this rapid expansion in CAPD has had its problems. The drop-out rate at 1 year is about 50 %, including transplantation (fig. 1) and the main cause of failure is peritonitis<sup>3</sup> (Table I). Part of the reason for this high drop-out has been the practice in a number of units of performing CAPD without adequate nursing/medical staff or an appropriate area. It may also reflect the use of CAPD in a high risk group of patients, who were found unsuitable for HD. The high drop-out may also re-

ACTUARIAL SURVIVAL ON C.A.P.D. IN THE U.K. (n = 330)

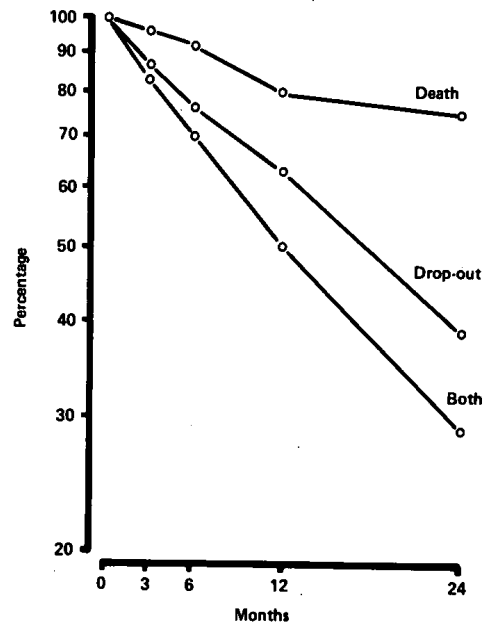


Fig. 1.—Actuarial survival and drop out rate in CAPD patients in the United Kingdom (N = 330) in 1980. The drop outs include those successfully transplanted (see Table I).

fect an early learning or «teething» phase. Results are beginning to improve as units realise the importance of staff and area for CAPD and for using it as a primary form of treatment in patients suitable for it.

**CAPD IN NEWCASTLE-UPON-TYNE**

CAPD was introduced in Newcastle-upon-Tyne in January 1979 and over the first 3 years 122 patients (78 M, 44 F; mean age 40 range 5-68 years) were managed on CAPD for a mean period of 11 months (1-36 months) by previously described techniques<sup>4</sup>. Four patients were diabetics and 9 were children. They underwent 3-4 exchanges per day and were maintained on a liberal diet of 2300-3000 Cals., containing 80-90 g. of protein which provided 13 % of the total calorie intake. Carbohydrates provided 51 % of calories and fats 36 % (saturated/unsaturated ratio of 11:1)<sup>5</sup>.

Of the 173 new patients taken on for CRF treatment over the 3 years (1979-1981) 53 % received CAPD as their primary treatment (19 % IPD; 13 % Hospital HD; 15 % Home HD). CAPD has thus enabled a doubling of the acceptance rate of new patients from 1978 to 1981.

**OUTCOME**

This is shown in Table II. Eighteen patients were transplanted while 19 of the thirty-three failures were due to peritonitis. All were transferred to hospital IPD or haemodialysis. The two deaths were related to cardiovascular problems. The actuarial patient survival was 80 % at 2 years while the actuarial technique sur-

TABLE I

**CAUSES OF ABANDONMENT OF CAPD IN U. K. (1980)**

Cause of drop out	Patients treated	
	< 1 year	> 1 year
	(%)	
Peritonitis .....	35.1	30.5
Psychological .....	9.1	15.7
Changed to other treatment (including transplantation) .....	45.5	53.8
Other .....	10.2	—
<b>TOTAL DROP OUT .....</b>	<b>100.0</b>	<b>100.0</b>

TABLE II  
OUTCOME IN 122 CAPD PATIENTS  
IN NEWCASTLE-UPON-TYNE

Transplanted .....	18
Failures * .....	33
Peritonitis .....	19
Exit site inf. ....	1
Failure to learn ..	3
Diabetes .....	2
Neoplasia .....	2
CVA .....	1
Diaphr. Hernia ..	1
Periph. Neurop. ...	1
Mesenteric infarct	1
Deaths .....	2

\* Mean period of CAPD 8 months (1-29).

vival, corrected for those patients transplanted was 63 % at 2 years (fig. 2). Rehabilitation was good with 60 of the 74 patients on CAPD for longer than 6 months, fully rehabilitated at work or in the family. 14 patients were able to take care of themselves but unfit to work.

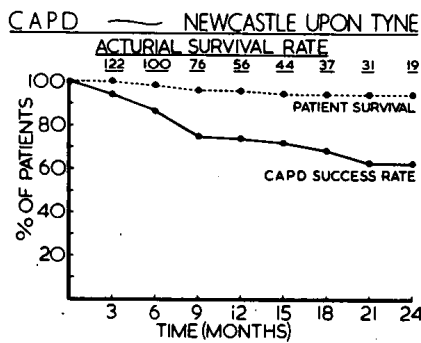


Fig. 2.—Actuarial patient and technique survival in patients in CAPD in Newcastle-upon-Tyne, U. K.

**BIOCHEMICAL CONTROL**

The control of plasma sodium, potassium, chloride, urea and creatinine was good; mean values for the latter two were 20 mmol/l. and 1000 µmol/l. respectively. Plasma bicarbonate was in the low normal range as were levels of serum protein and albumin. Serum magnesium levels were high, reflecting the high PD fluid magnesium level of 0.75 mmol/l.

**ANAEMIA AND HYPERTENSION**

The haemoglobin levels rose steadily to a plateau of 10 g/dl. (fig. 3) while it was possible to stop or reduce the use of antihypertensives in more than half of those on treatment for hypertension at start of CAPD. However, in 10 patients treatment had to be started and the dosage increased. In two patients bilateral nephrectomy was necessary to control the blood pressure.

**CAPD—THREE YEAR FOLLOW-UP**

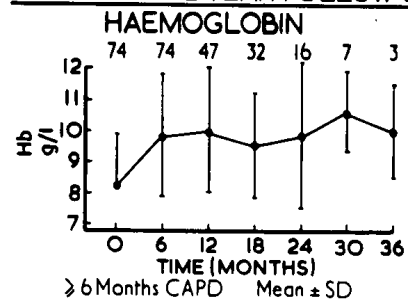


Fig. 3.—Rise in haemoglobin levels in CAPD patients in the Renal Unit at Newcastle-upon-Tyne (N = 74; CAPD ≥ 6 months).

**OBESITY**

Of the 74 patients on CAPD for greater than 6 months, 22 patients gained up to 10 % of their starting weight, while 15 gained 10-30 % of their original weight and these were positively obese. 6 patients lost weight. The weight gain is a reflection of the increased appetite, the glucose absorbed from the PD fluid and sometimes indiscriminate eating.

**HYPERLIPIDAEMIA**

In a sequential study with measurement of serum triglycerides and cholesterol every 3 months, 7 of 30 patients had persistently elevated triglyceride levels (> 3 mmol/l. normal 0.8-2.0) whereas 13 patients had marked cholesterol elevation (> 8 mmol/l., normal 3.7) (figs. 4 and 5). In a cross sectional study of 30 patients, a third had elevated cholesterol levels related

**SEQUENTIAL CHOLESTEROL LEVELS IN CAPD PATIENTS**

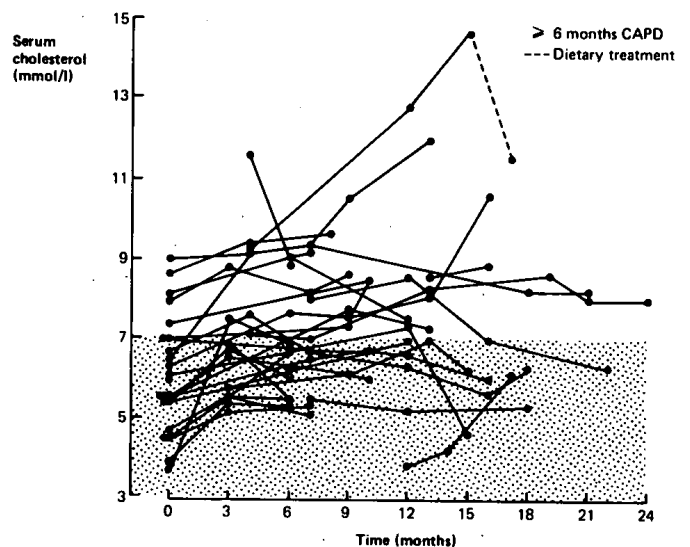


Fig. 4.—Sequential cholesterol levels in CAPD patients. Shaded area shows the normal range. By and large those with levels above normal, continued to rise while those in the normal range at start remained so.

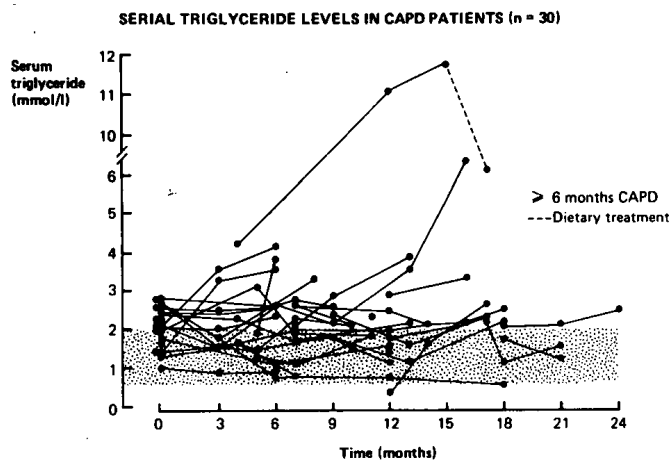


Fig. 5.—Sequential triglyceride levels in CAPD patients.

to increases in low density (LDL) and very low density (VLDL) lipoproteins whereas HDL cholesterol was in the low normal range in most patients. Serum triglyceride levels were elevated as 40 % predominantly in the VLDL and LDL lipoprotein fractions.

In a sequential study of lipoprotein fractions over 12 months there was a rise in total cholesterol related to LDL levels but the HDL cholesterol levels remained low.

### HERNIAS AND PERITONEAL PROBLEMS

Umbilical hernias were encountered in 6 patients, while one paediatric patient developed a marked scrotal swelling related to a patent processus vaginalis. One patient developed a diaphragmatic hernia requiring major surgical procedure.

None of the patients experienced loss of ultrafiltration except at times of an episode of peritonitis. Peritoneal clearances were not measured but creatinine and urea values did not change, except in those that became obese.

### DISCUSSION

CAPD provides a very exciting treatment with tremendous potential. In the U. K., however, its initial injudicious use, may have led to the high drop-out rate. However, in units with good experience the figures are acceptable but still inferior to the technique survival of HD.

The major problems that need to be overcome are peritonitis, mechanical problems with catheter, development of obesity and hyperlipidaemia and possible loss of ultrafiltration and clearances. On the evidence available hypertension may be easier to control initially

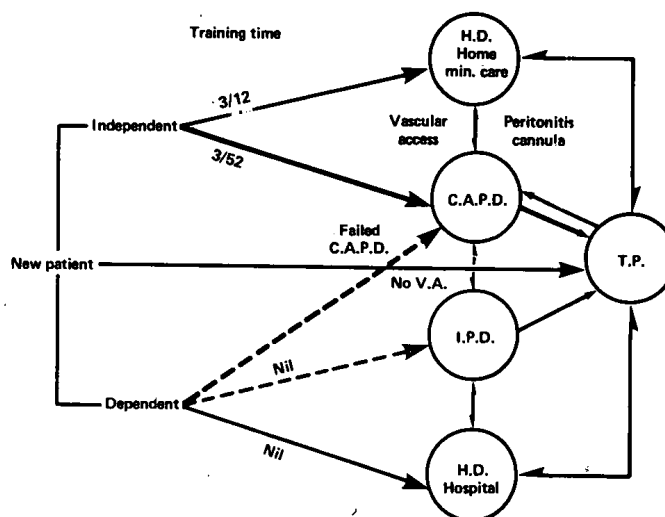


Fig. 6.—Integration of renal replacement therapy in Manchester Royal Infirmary, Manchester. A new patient is assessed for Home (or independent) or hospital (dependent) dialysis and then placed on the appropriate therapy (either home haemodialysis, minimal care haemodialysis or CAPD for the independent group; or hospital intermittent PD or hospital haemodialysis). At any stage the patient's treatment modality can be changed depending upon circumstances but the ultimate aim is transplantation (TP) which is performed in about 10 % of patients PRIOR to dialysis.

but the control is then lost in some long term patients.

It would seem that a free diet may be injudicious and calorie and carbohydrate restriction with increase in the consumption of polyunsaturated fats may be necessary.

The quality of life on CAPD is good with marked well-being and freedom. However, for best results it should be undertaken as part of an integrated dialysis and transplant programme, and conducted with adequate nursing and medical staff and appropriate area for CAPD. Such an integrated programme does exist in Newcastle-upon-Tyne and in the Renal Unit of the Manchester Royal Infirmary, Manchester. The integration in the latter Unit is shown in figure 6, with transplantation as an ultimate goal for the patient.

CAPD provides a nephrologist with additional armamentarium to manage a patient with renal failure; it is unlikely to supersede haemodialysis.

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