EDITORIALES

CAPD - Long term results of outcome and complications

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Introduction

There has been a dramatic increase in the use of CAPD throughout the world since the first inception in 1976 [1]. At the end of 1986 there were nearly 32,000 patients throughout the world on this therapy, representing about 11 % of all the dialysis popularion [2]. Its deployment in the various countries differs depending upon local circumstances. In some countries like the UK over 40 % of dialysis patients are on CAPD [3].

The early CAPD experiences as reflected in EDTA statistics showed that at the end of 24 months less than a third of the original patients were still on the therapy, the remainder having either died or changed to other dialysis modalities [4]. The reasons for this were not too difficult to discern. Invariably there was a lack of adequate facilities, nursing and medical staff to conduct CAPD [5]. The results reflected an early phase where Units were acquiring expertise in conducting CAPD. Patient selection was obviously biased and almost certainly a higher risk group and the elderly were managed on CAPD.

However, if one looks at the very early haemodialysis experience in the 60's then the results are not too dissimilar; a two year drop out of about 60 % was reported [6]. The problem of CAPD therefore has been a) a comparison with current haemodialysis (HD) results and b) telescoping its learning experience within five to ten years what it has taken HD more than 20 years to achieve.

Outcome - "drop out"

The overall drop out definition includes death, transplantation, change to other modes of therapy for a period greater than two months and return of renal function. Obviously transplantation and return of renal function are desirable. Death to some extent is inevitable. So the contentions point is whether CAPD has a greater "drop out" or therapy change to HD as compared to other dialysis modalities. It is unfortunate that the term "drop out" was ever coined since it has a derogatory connotation. Instead retention rate or change of therapy would have been appropiate. Data to be presented in this review relates to therapy change for patients managed in the United Kingdom, and USA. There are no recent EDTA data to report.

UK experience

The data from the UK is based predominantly upon the recently reported Seven Centre prospective study looking at all new patients starting dialysis over a three year period 83-85 with a follow up of up to four years [7]. The aim of the study was to evaluate technique and patient survival, reasons for choice of therapy and risk factors at start of therapy with correlation between these. Over the three years of patient intake, 610 new patients started CAPD as opposed to 329 on HD. The population were similar other than a greater number of elderly patients and those with cerebro cardiovascular disease in the CAPD group.

The outcome at four years showed that a third of the patients were continuing on their original therapy, about 40 % were transplanted, with 13 % having died. A higher percentage changed dialysis therapy in the CAPD group (15.4 %) as compared to HD (6.7 %). The cause of mortality was predominantly cardiovascular in both groups whilst the causes of change of therapy are shown in Table I in both groups.

Table I Seven centre study

Reasons for change			
CAPD to HD	(94)	HD to CAPD	(22)
Peritonitis	44	Loss of Vascular access.	6
Loss of UF	8	CV instability	2
Loss of Peritoneal capacity.	4	Patient Preference	1
Inadequate Dialysis	3	Social	2
Tunnel/Exit	4	Others	11
Catheter Obstruction	5		
Fluid Leak	4		
Patient Preference	4		
Other	18		

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The Kaplan Meier estimates show actuarial patient survival of 74 % (HD), 62 % (CAPD), whilst that for change of therapy (death, transplantation and return of renal function excluded) showed figures of 92 % (HD), 62 % (CAPD). Using Cox's multivariate analysis, age > 60 years, presence of cardiocerebrovascular disease, diabetes mellitus and amyloid at start of therapy were adverse risk factors for survival in CAPD groups, whilst there was no risk factors that were associated with change of treatment.

The other longterm study conducted in the UK was a retrospective one involving four units [8]. It addressed the question: How many patients starting CAPD before December 1981 were still on it after December 1985. Of a total of 177 patients, only 34 (19 % were still on CAPD; 54 % were transferred to HD and 25 % were transplanted. Cox's analysis again showed that age, peritonitis, amyloidosis, adversely affected outcome.

From the UK studies it is apparent that CAPD is used twice as often as HD as a first line therapy for end stage renal failure. Transplantation is the main reason for drop out but for change of therapy peritonitis catheter related problems impart a significant, degree of morbidity and are the main causes for change of therapy.

USA experience

In the NIH CAPD registry, records on over 17,000 patients are available [9]. Analysis of this data reveals that at three years there was a 75 % probability of drop out which included death and transplantation. The probability of transfer to another dialysis modality was 44 % (Table II).

Table II. NIH Registry. Cummulative probabilities for (%)

Year	1	2	3
Peritonitis	60	78	87
Exit/Tunnel	31	46	54
Catheter	19	33	43
Drop Out	30	62	75
Transplant	10	18	23
Transfer	18	32	44
Deaths	16	30	32

The survival over three years of a standard popularion was greater than that of a risk population (elderly and diabetic). Cummulative probability for transfer to other forms of dialysis was not related to risk factors age and diabetes, confirming the seven centre study results. The major reasons for transfer was peritonitis (29 %) other medical causes (25 %), and patient "abuse" (14 %). Drop out was also related to distance of home from centre, social circumstances and previous dialysis therapy.

Canadian experience

The recent report of the Canadian Dialysis registry [10] relates similar results to the above studied. The actuarial technique survival has been broken down into various age groups and compared to that with HD. Peritoneal dialysis does less well than the HD in the age group 15-44 yeats. However, this difference disappears in the higher age group 45-64, both for patient survival and technique survival. Reasons for discontinuing CAPD in Canada (1985) was transplantation (35 %) peritonitis (28 %), unable to cope (6 %), inadequate dialysis (6 %), abdominal complication (5 %) and other reasons (20 %).

Best demonstrated Programme (BDP) Study - USA

In the United States, Travenol sponsored this study [11] with the purpose of improving CAPD patient retention by following carefully patient retention and causes of failure and trying to improve clinical practice by sharing the technique from successful programme to others that were less successful. The study incorporated 150 centres with over 7,500 CAPD patients (30 % diabetics, 38 % cerebrocardiovascular disease at start).

The actuarial technique survival at six years was about 50 % (about 200 patients on CAPD > 6 years). The main reasons for transfer were once again peritonitis, psychological factors and other medical reasons. The disparity between the best (80 % technique survival at 3 years) and worst (< 10 % at 2 years) was striking. Upon further analysis of the 150 participating centres, 32 had excellent results. When the experience from the derived best demonstrated practices was then applied from the centres of excellence to those that had high drop out rates, there was a dramatic reduction (29 %/year) to HD before BDP reduced to 14.5 %/year in the failure rate in the latter units.

Prevention of drop out

Prevention of drop out therefore needs to concentrate on peritonitis and organisation of a programme, which is partly related to catheter problems and patient factors.

Peritonitis

The probability of (87 % at 3 years - NIH study; 90 % at 3 years Seven Centre Study) is very high. Whereas this is not the experience of the Italian groups using the Y set, this still prevails in countries outside Italy.

Prevention of peritonitis is related to the system design. There is no doubt that the Y set and the O are superior to the standing systems [12, 13]. In Italy, it has

been proven beyond any doubt to review the peritonitis rates and its use in Europe and the UK is on the increase. However, the Y system does not erradicate peritonitis. The recent interesting studies on the pathogenesis of peritonitis have shown the value of intraperitoneal cells, immunoglobulins and opsonising factors in highlighting the deficiencies of the host defence in some patients (ref 14 and 15). There have been improved results with administration intra-peritoneal IgG [16] and some work to suggest that vaccination against coagulase negative staphylococcus may be possible [17]. In addition there has been work on the production of an extra cellular slime substance by staph epidermidis which can act as a potential site of dissemination of bacteria [18]. The problem of peritonitis is then a delicate balance between the host defence and the invading organism be it through innoculation at the exchange procedure or colonisation of catheter. The aim would be to boost up the host defences in order to reduce the peritonitis rate.

Organization of the CAPD Programme

This is absolutely crucial in order to achieve success [19]. There is no doubt in my mind that an enthusiastic multi disciplinary team is essential. There is the need to have adequate nursing staff, one nurse to every ten patients and home nurses as well to supplement and back up what is taught in the units. There is no substitute for a good training area and programme which will include a protocol, teaching aids and one to one teaching. There needs to be adequate HD back up and hospital beds for admission of patients who come in with complications. Most importantly there is need for a 24 hour knowledgable on call staff in the hospital, to answer the telephone and other queries from CAPD patients. Finally it is crucial that the Physicians in charge maintain an interest in the therapy at all times; to set up a programme and place it on "auto-pilot" can be a recipe for problems.

Catheter problems

Again a fair amount of work needs to be done. Silicon which is used for Tenckhoff catheter is certainly not ideal neither is the design and implantation techniques. Problems of persistent exit and tunnel site infections do impart considerable morbidity to the patient (Table II). The new Swan Neck catheter may be an improvement but experience is still limited, more morbidity to the patient. The new Swan Neck catheter may be an improvement but experience is still limited.

Metabolic and nutritional problems

Other concerns on long term CAPD is the viability of the peritoneum over prolonged use. Loss of ultrafiltration and peritoneal sclerosis are important and have been discussed elsewhere in this symposium.

Metabolic implications related to the renal osteodystrophy appear to be no greater in CAPD than on HD. The same principle applies to its management, namely control of serum phosphate (at about 1.5 mmol/l) by initially using oral calcium carbonate as a phosphate binder, maintaining a high normal ionised serum calcium level (at 1.3 mmol/l) to suppress PTH and supplementation with Vitamin D analogues of grounds of hypocalcaemia or renal bone disease. Aluminium intoxication is still possible but can be minimised using calcium carbonate initially. The reader is referred to recent reviews in the literature [20-22].

Nutritional problems have not been overt but because of continued protein losses in the effluent and diminished intake malnutrition is a worry. No long term data are available about nutritional changes; Lindholm and Bergstrom have reviewed this recently to which the reader is referred [23].

Conclusion

CAPD has now been conducted for about ten years. Median term survival figures for patients and technique are comparable to HD. The longest surviving patient on CAPD is into her tenth year, and many more who have gone beyond 5 years [24].

Is CAPD a viable therapy? The next five years should provide the answers. It is more than probable that it will be a long term viable therapy but it is going to be related to its deployment in the type of patient that is put on to it. More importantly improvements in peritonitis and catheter related problems, would dramatically increase the retention rate. CAPD should be accepted as an equal part partner to other dialysis modes in an integrated manner. The question then would be what is the most appropiate therapy for an individual patient and not whether CAPD is better or worse than HD.

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