Renal Replacement Therapy In HIV Positive Patients; Experience With CAPD

Division of Nephrology*, Urology* and Microbiology* SRMC and RI, Chennai - 600 116. India.

Abstract: Four male patients who were HIV positive with end stage renal failure were initiated on renal replacement therapy using Continuous Ambulatory Peritoneal Dialysis (CAPD). Two of them were type II diabetics. Three of these patients were on Hemodialysis elsewhere and once they were found to be HIV positive, they came to us for CAPD. The mode of transmission of HIV to these patients were unknown. They were on CAPD for a total of 44 patient months. They were using the Y system for CAPD. One patient had colon cancer which was treated and had an existing colostomy bag. There was one episode of peritonitis in one patient. The patient with colostomy and malignancy died of septicemia at home. One patient is on antiretroviral therapy. Two patients continue on CAPD.

Key Words: Peritoneal Dialysis, HIV Infection

Introduction

HIV infection has assumed pandemic proportions since the first few cases of acquired immune deficiency syndromes reported from US in 1981. Since then there has been a dramatic increase in the incidence of opportunistic infections and multiple organ dysfunction including glomerulonephritis and renal failure.1 The treatment of HIV patients with end stage renal failure is the same as in patients without HIV infection.

Here in our study we have highlighted our current understanding of the role of the three basic modalities of Renal Replacement Therapy - Continuous Ambulatory Peritoneal Dialysis(CAPD), Renal Transplantation (RT) and hemodialysis(HD) - in HIV patients with end stage renal disease (ESRD).

Advances in highly active antiretroviral therapy (HAART)2 and the retrospective studies proving the role of immunosuppressive regimen especially cyclosporine in inhibiting the proliferation of Tcells in transplant recipients - RT is becoming increasingly done in developed countries in these patients with variable success. Maintenance HD is rarely used in India for HIV positive patients due to fear of its transmission to patients and health care workers.

In contrast CAPD has gained wide scale acceptance for HIV positive patients3 and due to its various advantages. These include maintenance of home environment, ease of administration of antiretroviral agents, freedom of movement to carryout personal and social activities and reduced chances of health care personnel contracting HIV.

Patient and methods

We had in our study reviewed four HIV patients out of the 177 started on CAPD, in our hospital between Feb 1990 - Nov 2002. The mode of transmission of HIV to 4 of these patients could be possibly due to either one or a combination of risk factors such as blood transfusion or transmission in a hemodialysis unit or through heterosexual contact. Patient A and B and C were using an ultrabag system (BAXTER) which is a modified Y set for exchanges which is disposable after single use. Patient D who was initiated on PD in the early 90's was using an O system (BAXTER) which is also a reusable Y system with amukin (sodium hypochlorite) as a disinfectant - for exchange.

Steps were taken by health care personnel from contracting HIV by institution of techniques as per universal precautions4. Attempts were made to ensure secured connections. Drained fluid was disposed only in toilets flushed well with bleach solution. Empty drain bags were either sent for incineration or were buried in deep underground pits of 10 feet depth.

A Standardised protocol for each patient was prepared taking into consideration age, sex, comorbidities, duration of CAPD, its outcome and CD4count (Patient A, B & C).
Table 1 shows the details of the patients with complications and outcome

<table>
<thead>
<tr>
<th>AGE</th>
<th>SEX</th>
<th>PREVIOUS HD</th>
<th>CAPD</th>
<th>COMORBIDITY</th>
<th>CD4 COUNT</th>
<th>DRUGS</th>
<th>COMPLICATIONS</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>55A/M</td>
<td>Yes</td>
<td>16 M</td>
<td>CAD, DM</td>
<td>(1) 470 cells/cu.mm</td>
<td>Zidovudine + Lamivudine</td>
<td>Pericatheter leak</td>
<td>Continue PD</td>
<td></td>
</tr>
<tr>
<td>56B/M</td>
<td>Yes</td>
<td>3 M</td>
<td>G.I. Malignancy and colostomy.</td>
<td>360 cells/cu.mm</td>
<td>No ART</td>
<td>Septicemia, Hypotension</td>
<td>Died</td>
<td></td>
</tr>
<tr>
<td>34C/M</td>
<td>Yes</td>
<td>6 M</td>
<td>HbsAg +ve</td>
<td>640 cells/cu.mm</td>
<td>No ART</td>
<td>No ART</td>
<td>Continued PD</td>
<td></td>
</tr>
<tr>
<td>72D/M</td>
<td>Yes</td>
<td>24 M</td>
<td>DM</td>
<td>-</td>
<td>No ART</td>
<td>ESI, peritonitis, genital edema, gastroenteritis</td>
<td>Died</td>
<td></td>
</tr>
</tbody>
</table>

ESI-Exit site infection, CAD-Coronary artery disease, DM-Diabetes Mellitus, G.I.-gastro intestinal.

ART - Anti Retroviral Therapy

Results

During the eleven year and ten months study period between Feb 90 - Nov 2001 four confirmed HIV positive patients (1.7%) of the hundred and seventy seven patients in the series initiated on CAPD were followed up. Patient D was initiated on CAPD in 1993 and ART was not available for use at that time and CD4 count could not be obtained.

Adequacy study by (Kt/v) revealed Kt/v in patient A as 2.2. The weekly creatinine clearance in patients A and C were 58 litres and 76.06 litres respectively. Both these patient showed high average transport status on Peritoneal Equilibration Test (PET).

During CAPD we encountered various problems attributable to the study procedure.

Patient A had developed pericatheter leak a month later and required a modality change to temporary hemodialysis for 3 weeks. He was later initiated on CAPD and is presently doing well.

Patient B, who had underlying colon cancer with colostomy on CAPD for 3 months developed septicemia with hypotension due to Klebsiella. Patient showed initial signs of recovery with effective antibiotic coverage and albumin infusion but subsequently died at home.

Patient C was on maintenance dialysis elsewhere and he was found to be HbsAg +ve with normal liver function tests. As his CD4 count was 640, ART therapy was not initiated.

Patient D aged 72 yrs who demonstrated HIV antibody in the dialysate fluid, developed a series of complications due to CAPD such as profound genital edema due to hypoalbuminemia or rupture of the tunica vaginalis, peritonitis due to streptococcus pyogenes; gastroenteritis due to both cryptosporidium and salmonella paratyphi A. Both peritonitis and gastroenteritis were successfully treated with appropriate antimicrobial therapy. Genital edema was treated with regular hypertonic dialysate exchanges, albumin infusion and elevation of foot end of the bed. He continued on CAPD and later died at home in sleep.

Discussion

Since our first publication in 1994 the advances in connectology, technique, nutritional management and retroviral therapy have all improved the survival of HIV patients on CAPD all over the world. Inspite of the few patients in our study we have documented 1 episode of peritonitis in 37 patients months. This low incidence is probably due to better connecting devices, antiretroviral therapy and near normal CD4 count. The recommended antiretroviral dosage for HIV positive dialysis patients are zidovudine 100-300 mg bid, lamivudine 25-300 mg od, didanosine 100-200 mg od, nevarapine 200-400 mg od, nelfinavir 250-1250 mg bd.

A study by Dressler et al showed high incidence of pseudomonal and fungal peritonitis in these patients.3

Retention rates on PD are however low due to high mortality rate and switch over to maintenance hemodialysis (28-45%) after the first year with marginal benefits.6
Patient A and C had retroviral load monitored periodically. The reason why we considered it vital to monitor CD4 count of HIV positive patients on dialysis was due to it being a good guide to assess a patients susceptibility to certain opportunistic infections such as Pneumocystis carinii pneumonia (PCP) and invasive atypical mycobacterial infections. Patient A discontinued antiretroviral therapy in January 2002. His CD4 count was estimated in February 2003 and it had risen to 1200 cells/ mm³. This rise in CD4 count is due to a possible beneficial immunomodulatory effect of CAPD. Further the patient did not have any episode of Peritonitis since the initiation of CAPD.

It has to be borne in mind that as dialysate drainage is a potential source of contamination, it is recommended that Universal precaution as proposed by the Centre for Disease Control, be followed, for these patients. Further as the estimated risk of transmission of HIV after a needle-stick injury varies from 1/200 for high risk exposure to 1/1000 for low risk exposure, it is necessary to counsel these health care professionals and offer HIV testing (PCR / HIV Viral load) as early as possible. Prophylactic zidovudine administration following needle-stick injury has been found to decrease the rate of HIV seroconversion.

Better understanding of the immunological function of the HIV positive patients with uremia have supported renal transplantation on the premise, that HIV infection does not have adverse effect on graft survival. There have been two reports of HIV positive patients undergoing liver or renal transplantation, who demonstrated normal graft function for at least 8 years. Historical data too suggests that there is a subpopulation of HIV positive transplant recipients who tolerate immunosuppression and in several cases, have demonstrated transplant survival comparable to that of HIV-negative transplant recipients. The widely perceived success of transplantation must be tempered by the realisation that there is always a delicate balance between sufficient immunosuppression to inhibit rejection and oversuppression that permits the growth of opportunistic infections and secondary tumor.

In conclusion, it is evident that with ongoing research and development, CAPD must be the first line of RRT, in HIV positive individuals. Dramatic advancement in immunosuppression associated with cyclosporine and related drugs have improved the outcome of HIV positive renal transplant recipients and has allowed it to become a clinical reality. Hence HIV patients with end stage renal failure should not be denied the benefit of RRT.

Reference