An Indian model for cost-effective CAPD with minimal man power and economic resources

Yogesh N.V. Reddy¹, Georgi Abraham¹,², Milly Mathew¹,², Rajan Ravichandran³ and Yuvaram N.V. Reddy¹

¹Division of Dialysis and Transplantation, Department of Nephrology, Madras Medical Mission Hospital, Chennai, India, ²Division of Dialysis and Transplantation, Department of Nephrology, Pondicherry Institute of Medical Sciences, Pondicherry, India and ³MIOT Hospital, Chennai, India

Correspondence and offprint requests to: Georgi Abraham; E-mail: abraham_georgi@yahoo.com

Keywords: anemia; chronic renal failure; peritoneal dialysis

Introduction

Chronic peritoneal dialysis is used as renal replacement therapy (RRT) among a large number of patients in the developing Asian economies. The socioeconomic status of the emerging economies is diverse and hence, the cost and utilization of peritoneal dialysis (PD) varies widely [1].

State of RRT in South Asia and the need for growth of PD

Only 3–5% of all patients with end-stage renal disease (ESRD) in India get some form of RRT from the existing pool of 900 nephrologists [2, 3]. As referral pattern varies widely in India for uremia therapy, there is no robust national database on the prevalence and incidence of dialysis therapy except for isolated reports. The cost of maintenance hemodialysis (MHD) for a single session varies from US $10 to 65 and most patients are maintained on twice-a-week dialysis. One-third of the 30 000 MHD patients are in the major metropolitan cities of Chennai, Delhi, Mumbai and Kolkata, whereas the majority of the Indian population lives in small towns and villages far away from cities. The hidden cost of travel to the hemodialysis (HD) center and loss of daily wages for the patient and the accompanying person is not usually calculated when the cost of HD is taken into consideration. The unmet needs of RRT must be covered by continuous ambulatory peritoneal dialysis (CAPD) that is available even in remote places in the country. There are ~7000 prevalent patients on chronic peritoneal dialysis in India. The cost is substantially less with PD, and the four industries which are involved in CAPD in India have network systems to deliver dialysis supplies to the residence without any additional cost. The use of erythropoietin (EPO) and iron is comparatively lower in CAPD patients compared to HD patients in India to the advantage of CAPD as a favorable RRT.

The growth of PD in South Asia

CAPD for chronic kidney disease (CKD) was initiated in India in 1991 with other South Asian countries following the Indian model [4, 5]. MHD is the major form of RRT in most patients except in Mexico, Thailand and Hong Kong where CAPD utilization is high [2]. Despite the relatively few contraindications and the added advantage of it being a simple home therapy, the penetration of CAPD has been only 18–20% yearly in India and lately, the PD first policy in Thailand has lead to an exponential increase in CAPD.

In developing countries in Asia, PD offers certain clear advantages over HD such as simplicity, reduced need for trained technicians and nurses, minimal technical support requirement, lack of electricity dependence, online water purification and home-based therapy with institutional independence which has potential cost savings.

PD and government

Containing cost and promoting PD is possible only through government support and health care insurance as shown by the example of the Thailand, Mexico and Hong Kong experience. About 60–90% of the patients cannot afford RRT due to social factors related to poverty [2, 3, 6]. A look at the Indian CKD registry data shows that 37.3% of patients have a monthly income of less than US $100, the majority are males (69.5%) (GDP US $1050), 31.4% are diabetics and with age between 19 and 60 years (www.ckdri.org). This harsh reality with hardly any insurance coverage for Indian PD patients precludes the growth and expansion of PD programs. A recent development of reimbursing dialysis for the federal government employees and the initiatives...
taken by some of the state governments in providing access
to dialysis to certain sections in the society has also ex-
panded the CAPD program in India.

The role of the pharmaceutical industry

Domestic manufacture of PD fluid and accessories in India,
China, South East Asia and Latin American countries has
reduced the cost of treatment. The cost of currently used
EPO, phosphate binders, vitamin D analogs and calcimi-
metics in India is given in Table 1, which is cost-effective.

In Asia and Africa, if the dialyzate manufacturing compa-
ies bring down the cost of their products on par with the
GDP per capita income, a positive effect will be seen on PD
utilization. The appropriate use of smaller exchange vol-
umes (6 L/day) in patients with smaller body size or those
with residual renal function can positively impact the daily
cost of PD without compromising adequate dialysis. A
reduction in complications of PD by implementing better
‘connectology’ techniques that aim at decreasing peritonitis
rates may reduce the associated hospitalization and treat-
ment costs [7]. Although expensive, in the author’s single-
center experience by using a single exchange of icodextrin
in patients with congestive cardiac failure and during epi-
isodes of peritonitis, this has proved to be a cost-saving
exercise in reducing hospitalization.

In CAPD patients with high transport status, vegetari-
anism leads to progressive depletion of serum albumin stores
impacting survival as shown in our study [8–10]. They
should be closely monitored for malnutrition by subjective
global assessment while on CAPD, as nutritional interven-
tion can slow down or improve malnutrition without switch
to HD [9]. We do not recommend HD as a primary modal-
ity for vegetarians with high transport status. An intensive
nutritional intervention with enteral feeding will be cheaper
than switching over to amino acid-containing solution in
developing countries.

Table 1. Current cost of EPO, phosphorus binders, vitamin D analogs and
calcimetics in Indiaa

<table>
<thead>
<tr>
<th>Drug</th>
<th>Cost (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sevelamer HCL (400 mg)</td>
<td>0.10</td>
</tr>
<tr>
<td>Sevelamer carbonate (400 mg)</td>
<td>0.04</td>
</tr>
<tr>
<td>Lanthanum carbonate (250 mg)</td>
<td>0.19</td>
</tr>
<tr>
<td>CaCO3 (500 mg)</td>
<td>0.10</td>
</tr>
<tr>
<td>Ca acetate (667 mg)</td>
<td>0.12</td>
</tr>
<tr>
<td>1-alpha vitamin D3 (0.25 mcg)</td>
<td>0.32</td>
</tr>
<tr>
<td>Calcitriol (0.25 mcg)</td>
<td>0.50</td>
</tr>
<tr>
<td>Doxercalciferol</td>
<td>1.06</td>
</tr>
<tr>
<td>Cinacalcet (30 mg)</td>
<td>102.20</td>
</tr>
<tr>
<td>Micera (50 mcg)</td>
<td>153.30</td>
</tr>
<tr>
<td>Micera (75 mcg)</td>
<td>205.40</td>
</tr>
<tr>
<td>Micera (100 mcg)</td>
<td>25.33</td>
</tr>
<tr>
<td>Eprex (2000 U)</td>
<td>4.25</td>
</tr>
<tr>
<td>Erypro/epoietin (2000 U)</td>
<td>10.00</td>
</tr>
<tr>
<td>Iron sucrose (100 mg)</td>
<td>3.33</td>
</tr>
</tbody>
</table>

aMicera—methoxy polyethylene glycol epoetin beta Eprex; erypro, reli-
poietin, repoietin—EPO alpha; Cresp—Darbepoetin.

Once-in-a-lifetime payment scheme for chronic peritoneal dialysis—a novel initiative

The ‘Once-in-a-lifetime payment’ scheme for patients paid
to the manufacturing industry for PD supplies enabled the
expansion of the PD program in India since 2003 [3]. With
a legal agreement between the patient and the dialysis in-
dustry, supplies consisting of a double bag transfer set,
mini caps, etc. are provided until the patient continues on
CAPD. The lifetime scheme currently costs Rs 700 000
(US $15 500) for three exchanges including all supplies
delivered at the place of residence either as a single upfront
payment or three installments over a period of 3 years.
Under circumstances such as a switch to HD, renal trans-
plantation or death, the remaining credit amount is re-
unded to the patient or family after deducting a nonrefundable amount of US $1100. This has the added
advantage of there being no cost escalation until the patient
dies or switches mode of therapy.

The total number of patients enrolled is ~3600 patients
by different dialysis providers in India. The current ex-
enses for those under the umbrella of this lifetime scheme
are US $375–500/month while doing three to four ex-
changes, respectively. Similar schemes are also available
for automated PD at a higher cost.

All ESRD patients anywhere in India are free to avail the
scheme. A multicenter retrospective study from South India
showed that of the patients who survived on PD for ≥3 years,
46% belonged to the once-in-a-lifetime payment scheme and
21% were fully reimbursed from their employers [11].

PD Suraksha insurance for peritonitis

A novel initiative was introduced in 2010 by a medical in-
urance company involving a payment of US $58/year ensur-
ing coverage for peritonitis treatment including hospitalization
and antibiotics for PD patients in India. All hospitalization
expenses are insured up to a sum of US $1063/year with a
premium of only US $58/year. If the patient requires catheter
removal, the cost of the new catheter, implantation surgery
and hospitalization is included. This scheme also provides
care for the cost of HD during the interim period when the
catheter has to be removed for infection.

Renal home care

Another unique initiative in India is the establishment of a
‘renal home care’ program initiated by the dialysis industry
recently. This works like a call center where patients can
call toll free and receive advice on CAPD from booking a
doctor’s appointment to instructions on catheter care and
when to consult their doctor regarding complications. Each
patient is given a unique patient ID number to facilitate this
process. They provide training and conduct pre- and
post-training evaluation to assess the effectiveness of the
training provided. Reinforcement to patients to adhere to
the training protocols and reminders for appointments en-
sure adequate patient compliance. This service is provided
in English and in eight local languages.
A survey of 275 south Asian nephrologists to assess roadblocks for CAPD expansion

The issues raised by the nephrologists were peritonitis by 30%, catheter-related problems by 10%, lack of timely CKD education by 91%, the lack of infrastructure and inadequacies of functioning HD unit by 42% and the lack of extended care facility support by 28%. Twenty-one percent felt that they had inadequate knowledge of CAPD. Although patient preference for PD was 73%, 74% of physicians were concerned about reimbursement from hospitals, insurance agencies and other sources.

As there is a global shortage of nephrologists, PD as a simple RRT can be a more suitable modality in the hands of trained nurses and technicians under the guidance of few nephrologists who have expertise on PD [12–14]. Innovative schemes such as once-in-a-lifetime payment for PD therapy and Suraksha insurance for peritonitis and generic medications for treatment of comorbidities have increased the penetration of PD with better survival.

Conflict of interest statement. None declared.

References


Received for publication: 13.5.11; Accepted in revised form: 23.5.11