Organization and Structure of a Peritoneal Dialysis Program: 

an important ingredient for success

Fredric O. Finkelstein
Hospital of St. Raphael, Yale University
New Haven, CT
Overview of Presentation

• Review of current status of PD in North America
• Review of recent changes in our understanding of the role of PD in managing patients with ESRD
• Review of the structural requirements for a successful PD program
% of prevalent patients on PD remains low; data from USRDS
% of incident patients starting PD remains low. Data from USRDS
Changes in Our Understanding of the Role of PD as Treatment for ESRD

- A renewed interest in PD as bundled payment model of reimbursement approaches
- Reduced mortality with PD vs HD for the initial year(s) of therapy
- Recent improvement in 1 year PD outcomes with strategies being developed to further improve the outcomes of PD patients
- The problem of the change in relative mortality rates of PD vs HD with time and problems with encapsulating peritoneal sclerosis

Recent changes in our understanding of PD – covered in other lectures in this series but briefly summarized in subsequent 4 slides. These observations makes the low PD utilization somewhat perplexing and should stimulate an interest in the growth of PD and an interest in how PD programs are organized.
Decline in Mortality Over Time: Striking Decline in Mortality of PD Patients in Recent Years
USRDS 2010

Dramatic drops in mortality over time for PD in recent years—more dramatic than for HD patients.
Unadjusted survival in 2007 dialysis patients, using propensity-matched modality data, by race & diabetic status: USRDS 2010

Propensity matching data from USRDS suggesting no significant differences in mortality in PD vs HD
Relative risk of patient survival and technique failure in patients from different time frames. Note marked drop in risk of death and technique failure in the more recent years.
Change in relative risk of death with duration of therapy from the Canadian Dialysis Registry. Note the lower RR of death in the initial months of therapy with PD and a relative improvement in the increased mortality with PD vs HD with increasing duration of therapy in the most recent cohort.
The Low Level of PD Utilization is Puzzling: additional reasons

- International comparisons
- National variations
- Nephrologists perceptions of what the patient distribution should be
- Patient perceptions of what they want
International Comparisons: % of patients on peritoneal dialysis

USRDS: 2010

% of prevalent patients maintained on PD is much higher in many countries
Great variability in % of ESRD patients maintained on PD in different states in the United States
Data taken from 4 different studies from 2000 to 2010. Nephrologists are asked what % of ESRD patients should be maintained on PD.
Nephrology Staff Replying CAPD/APD to the Question: *What do you consider to be the best dialysis initial treatment for a 65 year old patient with 1 comorbidity*  
Lebedo and Ronco: NDT Plus, 2008

Similar answers from different parts of the world
The Problem of low PD Utilization, at least in part, Relates to Problems with the Structure and Organization of PD Facilities

Let’s Review the Key Issues
Structural Requirements For A Successful CPD Program (Finkelstein: Kidney Int Suppl. 2006 103:S118-21)

- Development of robust and effective CKD education programs
Remember that 26% of patients leave the PD program each year because of mortality, transplant or technique failure. Thus, you need a continuous influx of new patients to maintain census size.
PATIENT PREFERENCE IN DIALYSIS SELECTION: NECOSAD 1997-2001
(Jager: AJKD 43:891,2004)

1347 patients

864 able to make choice
483 had contraind to PD or HD

416 start PD
445 start HD
386 start HD
97 start PD

38% of patients start PD

CKD education influences modality selection. Dutch Database examining patient selection – well developed CKD education programs
CKD education influences modality selection. Belgium: another example of well developed CKD education programs and % of patients opting for home dialysis.
PATIENT MODALITY SELECTION: THE IMPACT OF CKD EDUCATION
(New Haven CAPD-2002-2006: 50% of New Dialysis starts Receive CKD education)

CKD education influences modality selection. New Haven Experience (unpublished): Education results in much higher % of patients starting PD
There are Major Deficiencies in Providing CKD Education

• Lack of knowledge of CKD patients that they even have CKD
• Lack of knowledge about CKD
• Lack of knowledge about modality selection
Few patients with Stage 3 CKD realize they have CKD and less than ½ of Stage 4 CKD patients realize they have CKD. Note the lack of improvement in patient knowledge over time.
CKD PATIENT KNOWLEDGE:
The CRIOS Study: 7 Sites in Canada and U.S.  
(Finkelstein et al: Kidney Int, 74:1178-84, 2008)

• CKD patients (25% stage 3, 56% stage 4, 19% stage 5) were asked to complete a self administered questionnaire of 30 questions to determine knowledge of CKD and renal replacement therapies.

• 708 patients completed the questionnaire and had clinical and laboratory data available to analyze

• The median age was 65.8 years, 73.4% were Caucasian, 45.3% were diabetic.

• Patients had been seeing their Nephrologist for a mean of 5.2 years and 65% were seen by a Nephrologist for > 1 year

Study examining the degree of knowledge of CKD patients about CKD and Modality Selection
Percent of CKD Patients With **No** Knowledge of Various ESRD Therapies

<table>
<thead>
<tr>
<th>No knowledge of Modality</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No knowledge of HD</td>
<td>43%</td>
</tr>
<tr>
<td>No knowledge of CAPD</td>
<td>57%</td>
</tr>
<tr>
<td>No knowledge of APD</td>
<td>66%</td>
</tr>
<tr>
<td>No knowledge of transplantation</td>
<td>56%</td>
</tr>
<tr>
<td>No knowledge of Any modality</td>
<td>35%</td>
</tr>
</tbody>
</table>

| Frequency of Nephrology Visits and Number of Patients with Knowledge of ESRD Therapies |
|---|---|---|---|---|
| # of Visits in Preceding Year | 0-1 | 2-3 | >=4 | p-value |
| Knowledge of HD | 40.4% | 58.4% | 64.3% | <0.001 |
| Knowledge of CAPD | 25.2% | 43.2% | 50.8% | <0.001 |
| Knowledge of Transplant | 45.2% | 55.9% | 63.7% | 0.003 |

From Finkelstein et al: Kidney Int, 74:1178-84, 2008. Many patients seeing nephrologists for 4 or more visits in preceding year had little knowledge of various modalities.
Realities in the Current World of CKD Education

• Over 1/3 of incident ESRD patients, when questioned, report not knowing they had kidney disease
• The majority of CKD patients report not knowing they have kidney disease
• CKD patients seeing nephrologists know surprisingly little about CKD or ESRD treatment options
• 80% of incident HD patients start dialysis with a catheter
• Most dialysis patients do not understand the key factors impacting on outcomes
CKD Education: CMS Guidelines for Stage IV CKD Patients

- Educator services “are designed to provide beneficiaries with comprehensive information regarding management of co-morbidities, including for purpose of delaying the need for dialysis; prevention of uremic complications; and each option for renal replacement therapy (advantages and disadvantages).”
- “… the beneficiary .. (should) actively participate in his/her choice of therapy.”
- “(Educators) will develop outcome assessments ... To measure beneficiary knowledge about CKD and its treatment.”
- Individual or group sessions funded but no more than 6 sessions in a patient’s lifetime

CKD education is now covered by CMS in the United States. An exciting opportunity for CKD centers and nephrologists in the U.S.
Educational Interventions in ESRD and CKD Patients (Mason et al: AJKD 51:933, 2008)

• Comprehensive search for randomized trials of structured educational interventions in CKD and ESRD patients
• 22 studies identified
• The majority involved diet and/or fluid status in dialysis patients: nothing more
• Only one study involved long term study of CKD patients not on dialysis (Devins et al, AJKD 2003, 2005)

Review article concerning CKD education.
Purpose of Patient CKD Education:
what are we trying to accomplish?

• Improve outcomes of CKD:
  a) slow progression
  b) reduce CV risk
• Improve outcomes after the start of dialysis
• Provide information about modality selection concerning ESRD

Remember the purpose of CKD education
Communication Breaks Down

- Patients do not hear or understand what the physician is saying
- The physician does not hear what the patient is saying
The Problem With CKD Education Is Not Just That It Is Not Offered BUT That Is Not Done Effectively

• Traditional response to problems with patients about communication and change: give information and knowledge and expect patients to learn
• Current challenge: Revamp CKD education programs, focusing on change – addressing the issues of how individuals change their behavior or cope with changes in their living situation
PHYSICIAN (Nephrologist) BARRIERS TO REFERRAL TO CKD EDUCATION PROGRAM
(New Haven Experience)

• Concern about patient fear and denial –
  -- refusal to go
  -- referred and did not make contact
• Late referral by primary care physician
• Physicians perception that referrals were not necessary
Patient Barriers to Education

Munch: the Scream: 1896

- What do patients hear when ESRD care is discussed?
- It is easy to speculate
- But, to date, no studies have critically examined this question
Newer Approaches

• Recognition that modifying or changing behavior is a challenge
• Learn techniques that enhance an individual’s motivation to change.
• Apply techniques from motivational interviewing and cognitive behavioral therapy (logical and decision making analysis)

Empowering the Patient: The techniques enhance the individual’s ability to better understand their decision making and problem solving
Structural Requirements For A Successful CPD Program

- Development of robust and effective CKD education programs
- Development of appropriate support systems
  -- nursing
  -- social work
  -- dietary
NURSE’S ROLE: CRITICAL FOR SUCCESS

- Adequate nursing support to handle basic problems
- Adequate expertise in managing PD related problems
- Nursing coordination of various aspects of care, such as peritonitis, catheter and exit site care, anemia management, etc
- Adequate nursing staff to take night and weekend call

Well trained, competent, dedicated, independent nurses are the key to a successful PD program

Bernadini et al: (PDI 26:658, 2006) North/South America, Europe, South Africa, HK) reports on various aspects of nursing care, including site of training, training time for patients, timing of training, etc
SOCIAL WORK ROLE:
An Integral Role in the Program
(Wuerth: Seminars in Dialysis, 2006)

- Assess family functioning
- Assess caregiver burden
- Assess patient’s ability to cope with demands of home therapy
- Provide patient/family support and assess for possible areas of psychosocial intervention, e.g. clinical depression
- Function as a liaison between the medical care team and the patient and family system

Must play an integral role in the program and this involves addressing the psychosocial needs of patients
RISK OF PERITONITIS IN CPD PATIENTS  
(based on 281 BDI scores – peritonitis episodes in 6 months after each BDI)  
(Wuerth et al AJKD 42:350, 2003))

<table>
<thead>
<tr>
<th>Variable</th>
<th>Relative risk*</th>
<th>95% confidence intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI ≥11</td>
<td>2.7</td>
<td>1.23-6.03</td>
</tr>
<tr>
<td>Age ≥65</td>
<td>0.8</td>
<td>0.29-1.88</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.0</td>
<td>0.46-2.13</td>
</tr>
<tr>
<td>CAD</td>
<td>0.6</td>
<td>0.39-1.23</td>
</tr>
</tbody>
</table>

* Multivariate analysis

An example of how psychosocial factors impact on outcomes of PD patients. Patients with high BDI scores have a 2.7 fold greater chance of developing peritonitis.

BDI = Beck Depression Inventory
DIETICIAN’S ROLE

• Dietary instruction
• Critical role of sodium restriction in maintaining cardiovascular health
• Tracks and advises patients concerning:
  a) albumin levels/protein intake
  b) phosphate levels
  c) potassium levels
  d) weight gain or loss
Structural Requirements For A Successful CPD Program (Finkelstein: Kidney Int Suppl. 2006 103:S118-21)

- Development of robust and effective CKD education programs
- Development of appropriate support systems
  -- nursing
  -- social work
  -- dietary
- Development of appropriate CQI programs to monitor a variety of domains (discussed in PD K/DOQI guidelines, 2006, AJKD, 2006)

It is essential to track individual facility outcomes and compare them to local, national and international outcomes.
DEVELOPMENT OF EFFECTIVE CQI PROGRAM (K/DOQI PD Guidelines, AJKD, 2006)

- Morbidity and mortality
- Peritonitis rates
- Exit site infection rates
- Catheter problems
- Quality of life of patients and their family
- Patient satisfaction with care
- Other domains

It is essential to track individual facility outcomes and compare them to local, national and international outcomes.
Structural Requirements For A Successful CPD Program (Finkelstein: Kidney Int Suppl. 2006 103:S118-21)

- Development of robust and effective CKD education programs
- Development of appropriate support systems
  -- nursing
  -- social work
  -- dietary
- Development of appropriate CQI programs to monitor a variety of domains (discussed in PD K/DOQI guidelines, 2006, AJKD, 2006)
- Appropriate size of PD program
### NUMBER OF PD PATIENTS IN A TYPICAL U.S. DIALYSIS CENTER

<table>
<thead>
<tr>
<th>Total # Pts</th>
<th># of Units</th>
<th>% of total</th>
<th># Pts in group</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;50 pts</td>
<td>59</td>
<td>4.4%</td>
<td>4,158</td>
<td>19.6%</td>
</tr>
<tr>
<td>21 to 50 pts</td>
<td>290</td>
<td>21.6%</td>
<td>9,323</td>
<td>44.1%</td>
</tr>
<tr>
<td>11 to 20 pts</td>
<td>370</td>
<td>22.8%</td>
<td>4,588</td>
<td>21.7%</td>
</tr>
<tr>
<td><strong>6 to 10 pts</strong></td>
<td><strong>249</strong></td>
<td><strong>18.5%</strong></td>
<td><strong>1,938</strong></td>
<td><strong>9.2%</strong></td>
</tr>
<tr>
<td><strong>1 to 5 pts</strong></td>
<td><strong>439</strong></td>
<td><strong>32.7%</strong></td>
<td><strong>1,156</strong></td>
<td><strong>5.5%</strong></td>
</tr>
</tbody>
</table>

1,407 units with at least 1 PD patient

36% of pts in units with <20 pts

(data from Baxter-2009)

Most units in the U.S. are small with less than 10 patients
Adjusted relative risk of death by cumulative number of PD patients treated in an individual facility

Schaubel KI 2000 60:1517-1524

The greater the experience the lower the mortality rate
Technique failure rate correlates with size of the program– centers with < 20 patients had highest technique failure rates.
Higher technique failure rate in patients coming from units with less than 25 patients; confirming findings from Gao and Mujais (KI 64 S3,2003) indicating higher technique failure rate in units with < 20 patients.
Higher peritonitis rates in patients cared for in units with < 50 patients
Structural Requirements For A Successful CPD Program

• Development of robust and effective CKD education programs
• Development of appropriate support systems
  -- nursing
  -- social work
  -- dietary
• Development of appropriate CQI programs to monitor a variety of domains (discussed in PD K/DOQI guidelines, 2006, AJKD, 2006)
• Appropriate size of PD program
• Physician training
Health Care Provider Education

• Expand training options for physicians and nurses: *the poor training of nephrology trainees in PD therapy is now well documented*

• Dispel myths and focus on positive aspects of PD
  a) increased mortality: (already discussed)
  b) satisfaction with therapy
  c) problems with PD for the elderly ??
HD and PD patients report on their satisfaction with their care: patients are more satisfied with PD than HD.
150 prevalent patients rate PD as being more satisfying than HD and having less of a negative impact on their life. Patient scores are on a 1-10 Likert scale.

Data from New Haven
16 different domains evaluated and PD patients rated less of a negative impact of their treatment on these domains than HD patients.

Data from New Haven
Structural Requirements For A Successful CPD Program: Summary

• Development of robust and effective CKD education programs
• Development of appropriate support systems
  -- nursing
  -- social work
  -- dietary
• Development of appropriate CQI programs to monitor a variety of domains (discussed in PD K/DOQI guidelines, 2006, AJKD, 2006)
• Appropriate size of PD program
• Physician training
Question #1

• Nephrologists think that what % of ESRD patients should be on PD?
  – A. 10%
  – B. 30-40%
  – C. 60%
  – D. 80%
  – E. None of the above
Question #1 – Answer: B
Question #2

- If patients are have seen nephrologists 4x or more if the last year, what % report knowing about CAPD?
  - A. 10%
  - B. 25%
  - C. 50%
  - D. 75%
  - E. 90%
Question #2 – Answer: C
Question #3

• Which are of the following are associated with an increased frequency of peritonitis in PD patients?
  – A. Beck Depression Inventory scores of 11 or greater
  – B. Presence of CAD
  – C. Presence of diabetes
  – D. Age of 65 or greater
  – E. All of the above
Question #3 – Answer: A