Professional Standards in Peritoneal Dialysis

Dr Martin Lee
Director, Peritoneal Dialysis
Division of Nephrology
Department of Medicine
National University Health System
Disclosures

• Travel grants from Baxter and Fresenius Medical
ISPD and other guidelines

Consensus expert recommendations
- Guide best practice globally
- Should be adapted to local conditions
- Published evidence
- Expert practice
- Asian & Australasian representation – China, India, Malaysia/Indonesia?

How well does your local population fit the PD populations used to derive guidelines?

Is local data available to guide you?
Local PD priorities

Clinical
- PD uptake, penetrance
- Technique failure, drop-out/exit from PD
- Transplant
- Mortality – CVD, DM, elderly
- Peritonitis & PD catheter infections
- Hospitalization
- Quality of life

Non-clinical

Guidelines only help us with some of these
Guideline and Practice gap

International Guidelines

Local practice
Knowledge and Practice gap

- International Guidelines
- Local data, research
  - PD registry
- Local practice
- Local regulatory standards
- Local professional standards & guidelines
Data in PD

• Indispensable for clinical, administrative, regulatory compliance, funding, reform

• Database
• Software

• Data entry – who does it, and who pays for it?
• Analysis

• Data protection
• External agencies
• Legal aspects
## Causes of Drop-Out

<table>
<thead>
<tr>
<th>Cause</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deceased</td>
<td>54%</td>
<td>43%</td>
<td>27%</td>
<td>45%</td>
</tr>
<tr>
<td>Peritonitis</td>
<td>20%</td>
<td>36%</td>
<td>42%</td>
<td>24%</td>
</tr>
<tr>
<td>PD catheter-related infection</td>
<td>4%</td>
<td>2%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>PD catheter dysfunction</td>
<td>9%</td>
<td>0%</td>
<td>7%</td>
<td>2%</td>
</tr>
<tr>
<td>Conversion to HD – Technique Failure</td>
<td>11%</td>
<td>12%</td>
<td>5%</td>
<td>11%</td>
</tr>
<tr>
<td>Conversion to HD – Elective</td>
<td>2%</td>
<td>0%</td>
<td>2%</td>
<td>6%</td>
</tr>
<tr>
<td>Transplant</td>
<td>0%</td>
<td>5%</td>
<td>11%</td>
<td>5%</td>
</tr>
<tr>
<td>Others</td>
<td>0%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>
Patient months between hospitalization, by category

Categorized Hospitalization Rate of Patients on PD
(Yearly Comparison)

<table>
<thead>
<tr>
<th>Year</th>
<th>Infections</th>
<th>Preventable</th>
<th>Non-Preventable</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>22.2</td>
<td>38.6</td>
<td>13.4</td>
</tr>
<tr>
<td>2016</td>
<td>20.7</td>
<td>43.6</td>
<td>19.9</td>
</tr>
<tr>
<td>2017</td>
<td>20.7</td>
<td>41.8</td>
<td>19.9</td>
</tr>
<tr>
<td>2018</td>
<td>22.3</td>
<td>34.1</td>
<td>16.7</td>
</tr>
</tbody>
</table>
# Hospitalization Categories

<table>
<thead>
<tr>
<th>Infections</th>
<th>Preventable</th>
<th>Non-Preventable</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Access Related Infection</td>
<td>• Blood pressure-related</td>
<td>• Access related Non-Infection</td>
</tr>
<tr>
<td>• Non-Access related Infection</td>
<td>• Dialysis related – Fluid Overload</td>
<td>• Cardiovascular disease</td>
</tr>
<tr>
<td></td>
<td>• Dialysis related – Others</td>
<td>• Cerebrovascular disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other heart disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PVD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Others</td>
</tr>
</tbody>
</table>
Funding for PD
Funding

State

Non-state

Insurance

Patient

PD payment

PD expenditure

PD vendors
  • Commercial
  • Local

PD providers
  • Hospital
  • Community

Unseen costs
  • Patient, family
  • Society
PD funding

• Country-specific
• PD first, PD preferred or PD ‘last’
• Payers – who?
• Bundled or Itemized
• ESRD care vs RRT modality-specific reimbursement

• Cost of PD – to system and patient, review / rebasing
• Financial controls influence care
  • Examples: Icodextrin, biocompatible fluids, non-Ca phosphate binders
• Healthcare funding review and reform

• CADTH. Dialysis Programs in Canada: Implementation Considerations and Funding Practices https://www.cadth.ca/dv/dialysis-programs-canada-implementation-considerations-and-funding-practices
• CMS. ESRD reimbursement. https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ESRDpayment/index.html
• Wish, D. et.al., Rebasng the Medicare payment for dialysis: rationale, challenges, and opportunities. CJASN 2014. 9(12):2195-202
## US and Canadian dialysis

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health care spending (/capita)</td>
<td>5,274</td>
<td>3,572</td>
</tr>
<tr>
<td>% Gross domestic product</td>
<td>14.6</td>
<td>9.3</td>
</tr>
<tr>
<td>$ per patient with ESRD (US $)</td>
<td>60,337</td>
<td>45,094</td>
</tr>
<tr>
<td>Incidence of ESRD (/million)</td>
<td>340</td>
<td>158</td>
</tr>
<tr>
<td>Crude mortality rate (/100 patient-years)</td>
<td>19.0</td>
<td>16.1</td>
</tr>
<tr>
<td>Peritoneal dialysis use (%)</td>
<td>7.7</td>
<td>18.8</td>
</tr>
<tr>
<td>Home hemodialysis use (%)</td>
<td>0.6</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Clinical performance measures
Regulatory
- Conditions for Coverage, CfCs
- Home, center and hospital-based dialysis
- Nursing home PD
- Accreditation and training of PD staff
- Clinical decision-making authority
- Audits – informal and formal
- Patient’s own PD caregiver
- Communication
- Emergency staffing, care, supplies
- Reporting data
- Compliance
- Inspections

Clinical Performance Reporting – PD, CMS-821

- Amputations
- No body composition or hydration status measure

- Adequacy
  - Kt/V
  - CrCl
  - RRF
  - PD prescription
- Anemia – Hb, ESA, iron indices
- Albumin

20. PERITONEAL DIALYSIS ADEQUACY: The remainder of this form lists a series of questions regarding adequacy measurements for this patient. Please answer questions 20A and B FOR EACH TWO-MONTH TIME PERIOD indicated. Then continue to pages 3 and 4.

care represented by those data. For **PY 2019**, the clinical measures will include adequacy of dialysis (a composite of adult hemodialysis, adult peritoneal dialysis, pediatric hemodialysis, and pediatric peritoneal dialysis), vascular access (prevalence of AVFs and catheters > 90 days), hypercalcemia, National Healthcare Safety Network bloodstream infections (outcomes, not just reporting), standardized hospital

- **QIP penalties**
- **Dialysis Facility Compare**  [www.medicare.gov/dialysisfacilitycompare](http://www.medicare.gov/dialysisfacilitycompare)

Implications

• Reliance on Kt/V, CrCl to measure PD adequacy
• Pitfalls of Kt/V

• Increasing PD prescription time, volume to raise Kt
• Cost
• Impact on patient – time on dialysis, ability to work, quality of life

• Conversion from PD to HD
• Patients with no HD option - ?
Clinical performance measures
Professional
Clinical outcome measures

- PD Guidelines
- PD targets
  - Adequacy
    - $Kt/V$, $CrCl$
    - new multicomponent measure
  - UF
  - Laboratory measures
  - Complication rates – infections
- Mortality
- Hospitalization – PD-related, preventable
- Patient-centered or patient-reported outcomes
PD Catheter placement
PD catheter placement standards

- We recommend an audit of catheter insertion outcomes on at least an annual basis as part of a multidisciplinary meeting of the PD team, including attendance of access operators when feasible (1B).
- We suggest clinical goals specific for the PD access procedure include (2C):
  - Catheter patency at 12 months of >95% for advanced laparoscopic placement and >80% for all other catheter insertion methods.
  - Exit-site/tunnel infection within 30 days of catheter insertion: <5%.
  - Peritonitis within 30 days of catheter insertion: <5%.
  - Visceral injury (bowel, bladder, solid organ): <1%.
  - Significant hemorrhage requiring transfusion or surgical intervention: <1%.
- We suggest that incidences of pericatheter leaks within 30 days of catheter insertion be recorded separately for early PD starts (<14 days) and late starts (≥14 days) (not graded).
Infection Control
PD related infections

- Catheter-related infection
- Exit Site Infection, ESI
- Tunnel Tract infection, abscess
- Peritonitis
Peritonitis
<table>
<thead>
<tr>
<th>Rate, episodes per patient year</th>
<th>Rate, patient months per episode</th>
<th>Center</th>
<th>Period, PD population</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>24</td>
<td>ISPD Guideline</td>
<td>2016</td>
<td>Li et al., Perit Dial Int 2016; 36:481</td>
</tr>
<tr>
<td>0.186</td>
<td>64.5</td>
<td>Tokai University Hospital, Kanagawa, Japan</td>
<td>2001-2011 192</td>
<td>Nishina et al., Clin Exp Nephrol 2014; 18(4):649</td>
</tr>
<tr>
<td>0.192</td>
<td>62.5</td>
<td>Renji Hospital, Shanghai, China</td>
<td>2005-2009</td>
<td>Fang et al., Perit Dial Int 2014; 34:S35</td>
</tr>
<tr>
<td>0.206</td>
<td>58.3</td>
<td>NUH</td>
<td>2018</td>
<td>unpublished</td>
</tr>
</tbody>
</table>
Peritonitis Rate
Patient months per episode

![Graph showing the Peritonitis Rate and Division Target Rate from 2008 to 2018. The graph indicates a trend with peaks and troughs, highlighting the number of patient months per episode.]

- **Peritonitis Rate (Patient Months per Episode)**
- **Division Target Rate (≥35 patient months/episode)**

Year:
- 2008: 25.3
- 2009: 26.8
- 2010: 31.9
- 2011: 56.1
- 2012: 49.7
- 2013: 47.3
- 2014: 55.6
- 2015: 55.4
- 2016: 41.0
- 2017: 52.1
- 2018: 58.3
Culture-negative peritonitis

ISPD recommends <15% rate

Li et.al., ISPD Guidelines: Peritonitis. Perit Dial Int 2016; 36:481
Peritonitis – culture-positive rate

![Bar chart showing the culture-positive rate of peritonitis episodes from 2015 to 2018. The rates are as follows: 87.5% in 2015, 86.0% in 2016, 82.2% in 2017, and 85.4% in 2018.](chart.png)
Culture-negative peritonitis – local data influences treatment

NUH culture positive microbiology trend:

- Gram negative > Gram positive
Retraining to reduce peritonitis
**TABLE 2**
Indications for PD Re-Training

- Following prolonged hospitalization
- Following peritonitis and/or catheter infection
- Following change in dexterity, vision, or mental acuity
- Following change to another supplier or a different type of connection
- Following other interruption in PD (e.g. period of time on hemodialysis)
Catheter-related infections
Catheter infections – exit site, ESI and tunnel infections

ISPD 2017
- PD programs should monitor ESI and tunnel tract infection rates
- Continuous quality improvement
- Local analysis and interventions

Episodes per year (patient year of exposure)

*Insufficient data to recommend a target*

*Szeto et al., ISPD Catheter-related infection recommendations: 2017 Update. PDI 2017*
Blood-borne infections
Annex 1. New dialysis screening protocols for Blood Borne Diseases** at renal dialysis centres

<table>
<thead>
<tr>
<th>Pre-Dialysis status</th>
<th>Before admission</th>
<th>3 monthly [2 – 4 monthly*]</th>
<th>6 monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>Anti-HBs, HBsAg, Anti-HBc (Total)*, ALT, Anti-HCV</td>
<td>ALT</td>
<td></td>
</tr>
<tr>
<td>mat = HBV-susceptible [i.e. i) HBsAg, anti-HBs and anti HBc (total) negative; or ii) HBsAg, anti-HBs negative, and anti HBc (total) positive and HBV DNA negative]</td>
<td>HBsAg &amp; anti-HBs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All patients</td>
<td>Anti-HCV negative</td>
<td>Anti –HCV#</td>
<td>HIV Ag-AB</td>
</tr>
<tr>
<td>Anti-HIV negative</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ministry Of Health, Singapore. Revised screening protocols for blood borne diseases for renal dialysis centres. Circular 16/2019
Quality Improvement
Clinical Quality Improvement, CQI

- Peritonitis rates
- Culture negative peritonitis rates
- Exit-site infection rates
- Catheter problems and catheter survival rates
- Technique failure rates and causes

- QOL, patient satisfaction,
- Functional measures

- Other domains: adequacy measures, anemia, mineral & bone, BP, volume control, lipids, diabetes control, hypoglycemia rates

- Hospitalization rates and causes
- Mortality

- ISPD guidelines
- KDOQI Clinical Practice Guidelines Peritoneal Dialysis Adequacy – Quality Improvement Programs. 2006
Process Quality Improvement

- Work efficiency – outpatient, inpatient
- Productivity
- Value driven outcomes
- Resource utilization

- Staffing
- Funding / Income
- Cost recovery

- Coordination – hospital and community PD resources
Guidelines

1. International Society for Peritoneal Dialysis, ISPD. [https://ispd.org/ispd-guidelines/](https://ispd.org/ispd-guidelines/)
2. UK Renal Association. [https://renal.org/guidelines/](https://renal.org/guidelines/)
3. UK NICE guidelines.
   - Overview. [https://www.nice.org.uk/guidance/qs72](https://www.nice.org.uk/guidance/qs72)
   - Quality standards. [https://www.nice.org.uk/guidance/qs72/chapter/Introduction](https://www.nice.org.uk/guidance/qs72/chapter/Introduction)
     - Overview: [https://www.nice.org.uk/guidance/ipg208](https://www.nice.org.uk/guidance/ipg208)
     - Guidance: [https://www.nice.org.uk/guidance/ipg208/chapter/2-The-procedure](https://www.nice.org.uk/guidance/ipg208/chapter/2-The-procedure)
   - Guidelines: [https://academic.oup.com/ndt/issue/20/suppl_9](https://academic.oup.com/ndt/issue/20/suppl_9)
6. KDIGO. [https://kdigo.org/guidelines/](https://kdigo.org/guidelines/)
7. KDOQI. [http://kidneyfoundation.cachefly.net/professionals/KDOQI/guideline_upHD_PD_VA/index.htm](http://kidneyfoundation.cachefly.net/professionals/KDOQI/guideline_upHD_PD_VA/index.htm)
References


References


References

CATHETER PLACEMENT

FUNDING
Thank you!

Questions?