

PDOPPS Study Results Summaries

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The peritoneal dialysis outcomes and practice patterns study (PDOPPS):
Unifying efforts to inform practice and improve global outcomes in
peritoneal dialysis.

This paper describes the design and objectives of the international Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS) which may be of particular interest to the patients who have contributed to this study which we are so greatly appreciative of. Without their contributions to PDOPPS, none of this work would be possible.

Publication details: Perl et al., Peritoneal Dialysis International (2016) 36:297-307.

Background: Extending technique survival on peritoneal dialysis (PD) remains a major challenge in optimizing outcomes for PD patients while increasing PD utilization. The primary objective of the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS) is to identify modifiable practices associated with improvements in PD technique and patient survival. In collaboration with the International Society for Peritoneal Dialysis (ISPD), PDOPPS seeks to standardize PD-related data definitions and provide a forum for effective international collaborative clinical research in PD.

Methods: The PDOPPS is an international prospective cohort study in Australia, Canada, Japan, the United Kingdom (UK), and the United States (US). Each country is enrolling a random sample of incident and prevalent patients from national samples of 20 to 80 sites with at least 20 patients on PD. Enrolled patients will be followed over an initial 3-year study period. Demographic, comorbidity, and treatment-related variables, and patient-reported data, will be collected over the study course. The primary outcome will be all-cause PD technique failure or death; other outcomes will include cause-specific technique failure, hospitalizations, and patient-reported outcomes.

Results: A high proportion of the targeted number of study sites has been recruited to date in each country. Several ancillary studies have been funded with high momentum toward expansion to new countries and additional participation.

Conclusion: The PDOPPS is the first large, international study to follow PD patients longitudinally to capture clinical practice. With data collected, the study will serve as an invaluable resource and research platform for the international PD community, and provide a means to understand variation in PD practices and outcomes, to identify optimal practices, and to ultimately improve outcomes for PD patients.

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Regional variation in the treatment and prevention of peritoneal dialysis-related infections in the Peritoneal Dialysis Outcomes and Practice Patterns Study

Peritoneal dialysis (PD)-related infections lead to significant morbidity/illness, sometimes resulting in hospitalization. In this paper, we described infection-related practice patterns based on responses from 170 facility medical directors across PD facilities participating in the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS) in the countries of Australia/New Zealand (ANZ), Canada, Thailand, Japan, the UK and the USA.

Publication details: Boudville et al, *Nephrol Dial Transplant* (2019) 34: 2118–2126

The proportion of facilities reporting antibiotic administration at the time of PD catheter insertion was lowest in the USA (63%), intermediate in Australia/New Zealand (83%) and Japan/Thailand (86-89%), and highest in Canada (100%) and the UK (100%). The use of exit-site antimicrobial prophylaxis varied greatly across countries ranging from 4% in Japan and 28% in Thailand, to 91% in the US and 94% in Australia/New Zealand. Exit-site mupirocin was the predominant exit site prophylactic strategy in ANZ (56%), Canada (50%) and the UK (47%), and use of intranasal mupirocin highest in ANZ (33%) and the UK (24%). In contrast, exit-site aminoglycosides were more common in the USA (72%). For PD catheter tunnel infections, the use of intra-peritoneal antibiotics was highest in ANZ (61%), the US (56%) and Canada (45%) compared to 4-18% in other countries. Empiric Gram-positive peritonitis treatment with vancomycin was most common in the UK (88%) and USA (83%) compared with 10–45% elsewhere. Empiric Gram negative peritonitis treatment with aminoglycoside therapy was highest in ANZ (72%) and the UK (77%) compared with 10–45% elsewhere.

Conclusions. Large variation in PD-related infection prevention and treatment strategies exist across countries with limited uptake of ISPD guideline recommendations. Further work will aim to understand the impact that these differences have on the wide variation in infection risk between facilities and other clinically relevant PD outcomes.

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Patient-reported advantages and disadvantages of peritoneal dialysis: results from the PDOPPS

Patient-reported measures are increasingly recognized as important predictors of clinical outcomes in peritoneal dialysis (PD). This paper describes how we sought to understand associations between patient-reported perceptions of the advantages and disadvantages of PD and clinical outcomes.

Publication details: Sukul et al. BMC Nephrology (2019) 20:116-125.

In this cohort study, 2760 PD patients in the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS) completed a questionnaire on their PD experience, between 2014 and 2017. In this questionnaire, PDOPPS patients rated 17 aspects of their PD experience on a 5-category scale, with responses scored from - 2 (major disadvantage) to + 2 (major advantage). An advantage/disadvantage score (ADS) was computed for each patient by averaging their response scores to the 17 questions. The ADS, along with each of these 17 aspects, were used to predict their relationship with outcomes of mortality, transfer to hemodialysis (HD), patient-reported quality of life (QOL), and depression.

Study Sample: The study sample included national samples of randomly selected patients ≥ 18 years of age receiving chronic PD at randomly selected PD facilities in the countries of Australia/New Zealand (ANZ), Canada, Japan, Thailand, the United Kingdom (UK), and the US from 2014-2017. Results are based upon 2760 patients who had provided responses to 17 questions about the advantages and disadvantages of PD.

Results: While 7% of PD patients had an ADS < 0 (negative perception of PD), 59% had an ADS between 0 and < 1 (positive perception), and 34% had an ADS ≥ 1 (very positive perception). Minimal association was observed between mortality and the ADS. Compared with a very positive perception, patients with a negative perception had a higher rate of transferring to HD (hazard ratio [HR] = 1.67; 95% confidence interval [CI]: 1.21, 2.30). Among individual items, “space taken up by PD supplies” was commonly rated as a disadvantage and had the strongest association with transfer to HD (HR = 1.28; 95% CI 1.07, 1.53). Lower ADS was strongly associated with worse QOL rating and higher likelihood of having symptoms of depression.

Conclusions: Although patients reported a generally favorable perception of PD, patient-reported disadvantages were associated with higher rates of transferring to HD, lower QOL, and greater likelihood of depression. Strategies addressing these disadvantages, in particular reducing solution storage space, may improve patient outcomes and the experience of PD.

PDOPPS Study Results Summaries

International anemia prevalence and management in peritoneal dialysis patients

The optimal treatment for managing anemia (low red blood cells) in peritoneal dialysis (PD) patients and best clinical practices are not completely understood. This paper describes how we sought to characterize international variations in anemia measures and management among PD patients.

Publication details: Perlman et al., *Peritoneal Dialysis International* (2019) 39:539-546.

Methods: The Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS) enrolled adult PD patients from 6 countries (Australia/New Zealand (ANZ), Canada, Thailand, the United Kingdom (UK), and US) from 2014 to 2017. Hemoglobin (Hb), ferritin levels, and transferrin saturation (TSAT), as well as use of erythropoiesis stimulating agents (ESAs) and iron were compared at study enrollment in each country.

Results: Among 3,603 PD patients from 193 facilities, mean hemoglobin levels, ranged from 11.0 – 11.3 g/dL across countries, with a mean hemoglobin level=11.3 g/dL in ANZ. The majority of patients (range 53% – 59%) had a hemoglobin of 10 – 11.9 g/dL, with 4%– 12% patients \geq 13 g/dL and 16% – 23% $<$ 10 g/dL across all countries, with 17% of ANZ PD patients having a hemoglobin level $<$ 10 g/dL.

Use of ESAs for maintaining hemoglobin levels was higher in Japan (94% of patients) than elsewhere (66% – 79% of patients in other countries, 70% in ANZ). A low TSAT ($<$ 20%) as an indicator of possible iron deficiency was most common in the UK, ANZ, and Canada (where 24-27% of patients had a low TSAT) compared to 11-13% in the US and Japan. Use of intravenous (IV) iron, given for maintaining iron stores, was highest in the US (55% of patients) than elsewhere (6% – 17% patients) over a 4-month time period, with 9% of PD patients from ANZ prescribed IV iron over a 4 month period.

Conclusions: In this largest international observational study of anemia and anemia management in patients receiving PD, comparable hemoglobin levels were observed across countries but with notable differences in ESA and iron use and achievement of adequate iron stores.

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International comparisons of peritoneal dialysis prescriptions from the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS)

In this paper, we describe peritoneal dialysis (PD) prescription variations among Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS) participants using continuous ambulatory PD (CAPD) or automated PD (APD; n = 4657) from Australia/New Zealand (A/NZ), Canada, Japan, Thailand, United Kingdom (UK), and United States (US).

Publication details: Wang et al Peritoneal Dialysis International (2020) 40(3):310-319.

Results: CAPD was more commonly used in Thailand and Japan, while APD predominated over CAPD in A/NZ (66%), Canada, the US, and the UK. A facility's policy regarding the initial prescription of PD modality as reported by facility medical directors varied across PD facilities in A/NZ, ranging from whatever initial PD modality was chosen by the patient at 56% of A/NZ units, whereas 33% of A/NZ facilities indicated their policy was to use CAPD as the initial PD modality for patients, and 11% of A/NZ facilities having a policy of using APD as the initial modality for their PD patients.

Across countries, total prescribed PD volume normalized to body surface area (BSA) was intermediate in A/NZ for both CAPD (6.7 liters per 1.73 m² BSA) and APD (10.7 liters per 1.73 m² BSA). Numerous other aspects of peritoneal dialysis prescriptions were also described in this paper.

Conclusions: There is considerable international variation in PD modality use and prescription patterns that translate into important differences in achieved dialysis clearances. Ongoing recruitment of additional PDOPPS participants and accrual of follow-up time will allow us to test the associations between specific PD prescription regimens and clinical and patient-reported outcomes.

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Peritoneal Dialysis–Related Infection Rates and Outcomes: Results From the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS)

Peritoneal dialysis (PD)-related peritonitis carries high morbidity/illness for PD patients. Understanding the characteristics and risk factors for peritonitis can guide regional development of prevention strategies. In this paper, we describe peritonitis rates and the associations of selected facility practices with peritonitis risk among countries participating in the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS).

Publication details: Perl et al, *American Journal of Kidney Diseases* (2020) 76(1):42-53.

Setting & Participants: 7,051 adult PD patients treated at 209 facilities across 7 countries (Australia, New Zealand, Canada, Japan, Thailand, United Kingdom, United States) contributed data to PDOPPS to make this study possible.

Analytical Approach: Crude, overall rates of peritonitis were calculated for each country and for each PD facility participating in the study. In addition, particular patient characteristics and PD facility practices were examined to determine their relationship with the risk of having peritonitis.

Key Findings:

2,272 peritonitis episodes were identified in 7,051 patients to yield an overall crude peritonitis rate of 0.28 episodes/patient-year across all 7 countries. Facility peritonitis rates were variable within each country and exceeded 0.50 peritonitis episodes/patient-year in 10% of facilities.

Peritonitis rates, in episodes per patient-year, by country were:

- 0.40 (95% CI, 0.36-0.46) in Thailand
- 0.38 (95% CI, 0.32-0.46) in the United Kingdom
- 0.35 (95% CI, 0.30-0.40) in Australia/ New Zealand
- 0.29 (95% CI, 0.26-0.32) in Canada
- 0.27 (95% CI, 0.25-0.30) in Japan, and
- 0.26 (95% CI, 0.24-0.27) in the United States

The kinds of organisms causing peritonitis, and the frequencies of causing peritonitis by different organisms were similar across countries, except in Thailand, where Gram-negative infections and culture negative peritonitis were more common.

A 5% lower peritonitis risk was observed in facilities that had 10% greater use of automated PD use (RR=0.95; 95% CI, 0.91- 1.00, per 10% greater use of automated PD).

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A 17% lower risk of peritonitis risk was seen for facilities that used antibiotics at the time of PD catheter insertion (RR, 0.83; 95% CI, 0.69-0.99).

A 19% lower risk of peritonitis risk was seen for facilities with providing PD training for 6 or more days compared to less than 6 days of training (RR, 0.81; 95% CI, 0.68-0.96).

A 21% lower peritonitis risk was seen in facilities in which their patients routinely used topical mupirocin or aminoglycoside ointment at the catheter exit site (RR, 0.79; 95% CI, 0.62-1.01).

Limitations: Since these findings are based on data on how patients are treated there remains the possibility for treatment by indication bias and residual confounding that has not been accounted for by the statistical adjustments that were used to try and account for differences in the mix of patients in each comparison group. Residual confounding can affect the estimated risks seen in the current analyses - -either negatively or positively.

Conclusions: Important international differences exist in the risk for peritonitis. These differences in peritonitis risk across countries may result from potentially modifiable treatment practices – several of which we have highlighted in this investigation. These findings may help inform future guidelines as part of efforts to further reduce risks of peritonitis for PD patients.

Exposures: Facility characteristics (census count, facility age, nurse to patient ratio) and selected facility practices (use of automated PD, use of icodextrin or biocompatible PD solutions, antibiotic prophylaxis strategies, duration of PD training).

Outcomes: Peritonitis rate (by country, overall and variation across facilities), microbiology patterns.

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The association of functional status with mortality and dialysis modality change: results from the peritoneal dialysis outcomes and practice patterns study (PDOPPS)

This paper describes the prevalence of functional impairment (ability to do activities of daily living) in peritoneal dialysis (PD) patients, its variation by country, and its association with mortality or transfer to hemodialysis.

Publication details: Tennankore et al, Peritoneal Dialysis International (2019) 39:103-111.

Methods: Functional status (FS) was studied in 2,593 PD patients from countries of Australia/New Zealand (ANZ), Canada, Japan, Thailand, the United Kingdom (UK), and the US in the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS), from 2014 – 2017. Functional status was calculated by combining self-reports of 8 instrumental and 5 basic activities of daily living, using the Lawton-Brody and the Katz questionnaires. Summary FS scores, ranging from 1.25 (most dependent) to 13 (independent), were based on the patient's ability to perform each activity with or without assistance. The odds ratio (OR; 95% confidence interval [CI]) of a FS score < 11 vs =>11 was determined and comparing each country with the United States (US). Furthermore, the relationship of a low FS score with mortality and transfer to hemodialysis, was also examined after adjusting for differences in patient case mix.

Results:

Of 2,593 patients with complete data on FS, 48% were fully independent (FS = 13), 32% had a FS score 11 to < 13, 14% had a FS score 8 to < 11, and 6% had a FS score < 8. In Australia/New Zealand, 22% of patients had a FS score <11; in contrast, 30% of UK patients and 47% of Thai patients had a FS score <11.

Relative to the US, low FS scores (< 11; more dependent) were more frequent in Thailand (OR = 10.48, 5.90 – 18.60) and the United Kingdom (UK) (OR = 3.29, 1.77 – 6.08), but similar in other PDOPPS countries. The FS score was inversely associated with mortality in that patients having a FS score <11 on average had a >3 times higher mortality rate compared with patients who were fully independent (FS-13). In contrast, the rate of permanent switching from PD to HD did not differ for patients having lower versus higher functional status scores.

Conclusion:

Substantial differences in Functional Status scores were seen in PD patients across some countries in PDOPPS. Functional impairment, for patients having a FS<11, was associated with higher risks of mortality but not with permanent transfer to hemodialysis.