ASIA-PACIFIC CHAPTER NEWSLETTER

INTERNATIONAL SOCIETY FOR PERITONEAL DIALYSIS (ISPD)

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Contents

Editor's Note

Dear All,

In this issue, we have an excellent collection of articles on PD research in this region. Dr Melissa Nataatmadja will discuss the relation between glucose exposure and peritoneal transport. Dr Kiyotaka Uchiyama from Japan will describe his observation on exercise capacity and quality of life in PD patients. In addition, Professor Kook-Hwan Oh and Dr Rapul Ram will share their experience in patient training and assessment of catheter exit site infections, respectively.

The on-line registration for the coming ISPD Asian-Pacific Chapter meeting has opened. Go and get registered. See you in Nagoya !

You are most welcome to distribute this newsletter electronically or in printed form to your colleagues or other people interested. If you or your colleagues want to receive this newsletter directly from our editorial office, please send your e-mail address to: ccszeto@cuhk.edu.hk

Sincerely,

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Association Between Peritoneal Membrane Transport Characteristics And Exposure To Glucose And Glucose Degradation Products

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Glucose is the most commonly used osmotic agent in peritoneal dialysis (PD), and systemic absorption may result in complications, such as hyperglycaemia, weight gain and increased cardiovascular risk. Repetitive peritoneal exposure to high glucose concentrations has also been purported to cause local adverse effects, such as inflammation and vasculopathy of the peritoneal membrane, predisposition to peritonitis, and increasing peritoneal transport status. As a result, many physicians attempt to minimise peritoneal glucose exposure where possible.

Cohort studies evaluating the relationship between peritoneal glucose exposure and changes in peritoneal membrane transport status have yielded mixed results. Davies and colleagues examined a retrospective cohort of 22 patients from the Stoke PD Study who had received 5 years of continuous PD therapy [1]. Of these, 9 patients were exposed to increasing glucose exposure, and this group also demonstrated significant increases in peritoneal solute transport over time, as measured by the dialysate-to-plasma creatinine ratio at 4 hours (D:PCr4h). In contrast, the 13 patients with stable glucose exposure also maintained stable peritoneal solute transport. A prospective, single-centre cohort study of 574 incident PD patients also demonstrated increasing peritoneal solute transport and decreasing ultrafiltration capacity in those patients who were exposed to high glucose concentrations, while solute transport remained stable in those patients with low glucose exposure [2]. However, a retrospective cohort study of 32 patients in a single Taiwanese centre found no signification association between dialysate glucose exposure and changes in D:PCr4h on serial peritoneal equilibration tests (PET) done more than 6 months apart over a mean interval of 29.3 months (range 10 – 82) [3].

Understanding of the relationship between glucose exposure and changes in peritoneal solute transport rate has largely been based on retrospective cohort studies. Thus, we recently performed a secondary analysis of data from the balANZ trial, a prospective, multicentre, open-label randomised controlled trial, where participants were randomised to receive either conventional or neutral pH, low GDP, biocompatible PD solution [4]. Our analysis aimed to evaluate the effects of high peritoneal glucose exposure on peritoneal transport characteristics [5]. We analysed data from 165 incident, adult PD patients who had commenced kidney replacement therapy within the last 90 days and for whom documented baseline daily glucose exposure was available. Participants had a residual glomerular filtration rate of ≥5 mL/min/1.73m2 and a urine output of ≥400 mL/day. The dialysate glucose concentration (g/L) was multiplied by total volume of dialysate per day (L) to give the total daily dialysate glucose exposure (g/day). The D:PCr4h was determined using PET performed at months 1, 6, 12, 18 and 24 of the study. Measurement of peritoneal solute transport rate at month 1 was considered as baseline value. Change in peritoneal solute transport rate was calculated for months 6 (month 6 – baseline), 12 (month 12 – baseline), 18 (month 18 – baseline) and 24 (month 24 – baseline).

Results demonstrated increasing peritoneal glucose exposure over time (coefficient 1.49, 95% CI 1.07 – 1.92, p<0.001) and there was no significant association between glucose exposure and use of biocompatible solutions (p = 0.67). There was no significant association between peritoneal solute transport rate and time-varying peritoneal glucose exposure (coefficient 0.00004, 95% CI -0.0002 – 0.0001, p=0.68). Daily glucose exposure, measured as a continuous variable, was also not significantly associated with changes in peritoneal membrane transport status (coefficient 0.0009, p=0.37). The relationship between baseline peritoneal glucose exposure and change in peritoneal membrane transport status was not significant, regardless of whether baseline peritoneal glucose exposure was examined as a continuous (coefficient -0.003, p=0.26) or categorical (p=0.49) variable, in groups based on baseline glucose exposure (group 1 = first quartile; group 2 = second and

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third quartiles; group 3 = fourth quartile). When assessing the effect of PD solution on peritoneal solute transport over time, there was a significant difference between groups (p=0.001), where those receiving conventional solutions experienced greater increases in D:PCr4h over time compared to those receiving biocompatible solutions, consistent with previously published results from the balANZ trial [6]. These results potentially implicate GDP content, rather than glucose content, to be a more important factor to consider with regards to changes in peritoneal membrane characteristics.

Other studies have generated similar findings. An observational study by Kawanishi and colleagues demonstrated increased peritoneal membrane fibrosis, hyalinosis, and advanced glycosylation end-products (AGE) accumulation with use of conventional PD solutions when compared to biocompatible solutions, despite comparable use of high glucose PD solutions in both groups [7]. In addition, higher D:PCr4h and lower ultrafiltration was observed in those who received conventional solutions.

A recently published analysis of the Global Fluid Study also found that 71 patients treated with biocompatible solutions experienced stable solute transport after 2 years of PD therapy, whereas the 295 patients treated with conventional solutions demonstrated continuous increases in peritoneal solute transport rate [8]. In contrast to our study however, the investigators also found that increasing peritoneal glucose exposure was associated with increasing peritoneal solute transport rate. Some of these differences in findings may relate to variation in study design (observational vs. RCT), patient population (incident and prevalent vs. incident), and PD solution type (variable PD solution types vs. defined biocompatible solution).

In summary, our study did not find any significant association between peritoneal glucose exposure and changes in peritoneal membrane transport characteristics. Currently, there is no conclusive evidence demonstrating that high peritoneal glucose exposure leads to changes in peritoneal solute transport. Our study did, however, find an association between use of conventional PD solutions and increasing peritoneal solute transport, which has also been observed in cohort studies. This suggests that GDP exposure has an important influence on peritoneal membrane solute transport characteristics, perhaps more so than glucose exposure, and that the use of biocompatible solutions may help delay or prevent these changes.

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Frequent Patient Retraining At Home Reduces The Risks Of Peritoneal Dialysis-Related Infections

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Patient training is one of the most crucial parts of a successful peritoneal dialysis (PD) program [1], allowing patients to achieve adequate self-care, to prevent PD-related infections and, finally, to maintain good health. However, previous studies investigating the effect of patient training for the improvement of PD outcomes are limited. To date, no randomised trials have shown that patients with enhanced training experience reduced risk of peritonitis or improved PD outcomes. Furthermore, controversies still exist regarding patient training strategies such as the optimal duration and frequency of initial training, timing and frequency of retraining, and the sites for PD training.

Trial on Education And Clinical outcomes for Home PD patients (TEACH) [2], investigated whether frequent patient retraining at home on a regular basis after starting PD can reduce the incidence of PD-related infections and improve patient outcomes. As a multicentre randomized clinical trial, TEACH enrolled 104 incident PD patients from six centers in Korea. The patients were randomised into either the frequent retraining group (FG, n=51) or the conventional retraining group (CG, n=53).

During the break-in period, subjects in both groups received centre-based, one-on-one training on PD, equally. The training for FG and CG was provided by the same professional PD nurses in each PD centre. The curriculum was based on the ISPD guidelines and included an overview of PD, aseptic technique, hand washing, exchange procedures, exit site care, diet, and management of complications [1]. After starting PD, both the FG and CG groups were given two equal sessions of training at week 1 and month 2 in their homes by a PD nurse. However, additionally, the subjects in FG received extra home visits for regular retraining at months 4, 5, 6, 7, 8, 10, 12, 15, 18, 21, and 24. The home training sessions were one hour in length. The contents and curriculum of the home training visit were the same for both groups. The only difference between FG and CG was the number and frequency of retraining by home visits. The training included basic exchange procedures, fluid balance, infection, diet, medication, and trouble shooting.

Of the 104 subjects initially enrolled, thirty six (71%) from the FG and forty one (77%) from the CG finished the 24-month study. The overall drop-out rate and the causes for drop-out were not statistically different between the two groups. At baseline, there were no significant differences in age, diabetes, cause of renal failure, academic years, biochemical parameters and residual renal function (RRF). Over the 24-month trial period, subjects in the FG received more frequent training visits (10.6 ± 7.5 days vs 3.6 ± 3.6 days; $p < 0.001$). The number of unscheduled training visits were similar between the two groups (1.2 ± 2.0 days vs 0.9 ± 1.9 days, FG vs CG, p=0.51). The total time spent on PD training was longer in the FG (20.3 ± 9.4 hours vs 11.7 ± 6.7 hours; $p < 0.001$).

The overall exit site infection (ESI) rate for the total study population was 0.17 episode per year at risk (1 episode/ 72 patient-months). The differences in event rates (ESI and any PD-related infections) were not significant. However, as shown in Figure 1, event rates for the FG decreased over time, while the event rates for the CG increased after month 12 (p for interaction for group x time < 0.05 in our generalised estimating equations (GEE) model). This could be attributed to the cumulative effect of the frequent and sustained retraining in the FG.
The overall peritonitis rate for the total study population was 0.14 episode per year at risk (1 episode/ 86 patient-months). In the older subgroup (age≥60), frequent retraining at home exhibited a significant effect in the risk reduction of the first episode of peritonitis after adjustments (adjusted HR 0.01 (0.001-0.35), p=0.01). (Figure 2)

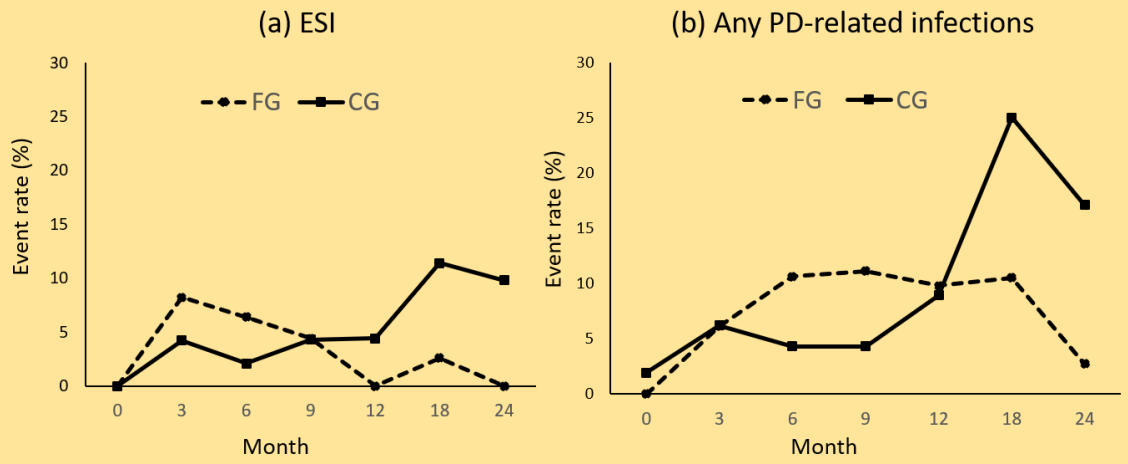

Figure 1. Event rates for exit site infection (a) and any PD-related infections (b) at each follow-up interval. Abbreviations: FG, frequent training group; CG, conventional training group. p for interaction between group and time point < 0.01 and 0.03 for ESI(a) and any PD related infections(b), respectively.

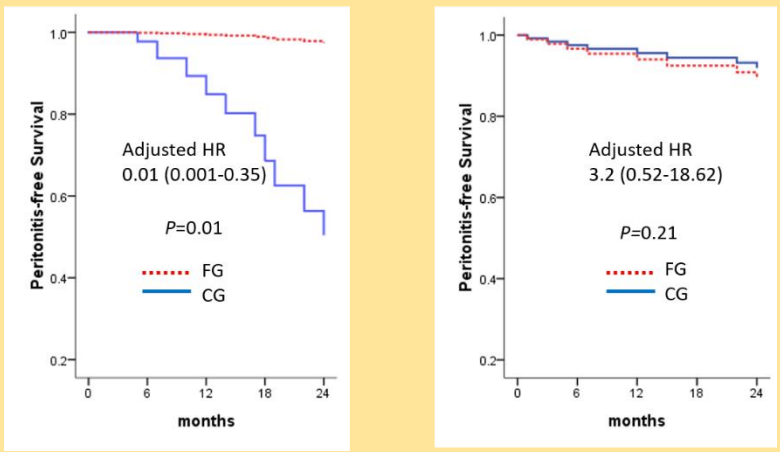

Figure 2. Peritonitis-free survival of the study participants. (a) Subgroup of patients with age ≥60, (b) subgroup with age <60. In the subgroup with age≥60, the peritonitis-free survival was significantly lower in the FG compared to the CG (adjusted HR 0.01, p=0.01). Abbreviations: FG, frequent retraining group; CG, conventional retraining group.

To summarize, the subjects in the frequent retraining group (FG) exhibited significant risk reduction of ESI and any PD-related infections over time, as compared to the conventional retraining group (CG). Additionally, intensive retraining independently reduced the risk of the first episode of peritonitis in older subjects (age≥60).

There have been no randomised trials to determine which location - PD centre or home - is better for patient training [3, 4]. However, most of the PD fluid exchanges and self-care procedures are carried out in a patient's home. Noting that home visits provide information on the way patients function and adapt in their own environments, the ISPD Nursing Liaison Committee strongly recommends home visits for the overall care of PD patients [1]. Further research is needed to determine the timing and frequency of home visits to maximise patient outcomes.
Periodic and continued training on a regular basis is crucial. Because patients tend to forget their initial PD training, they may alter the procedures they were taught [5, 6]. Sometimes, patients can become complacent about the PD procedure and begin to take shortcuts. That explains the importance of periodic and regular retraining for PD patients.

In conclusion, our clinical trial – TEACH - has shown that frequent home visits for regular and continued patient retraining reduces ESI and overall PD-related infections. This reduction might be attributed to longer training hours, repeated training over time, home visits, or all of the above.

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Upcoming Meetings

World Congress of Nephrology
12-15 April 2019
Melbourne Convention and Exhibition Centre (MCEC), Melbourne, Australia
Website: http://www.isnwcn2019.org/

ANZ PD Academy
17-18 May 2019
Novotel Sydney Brighton Beach, Sydney, Australia
Website: https://www.nephrology.edu.au/education/pd-academy.asp

9th Asia Pacific Chapter Meeting of International Society for Peritoneal Dialysis
5-7 September 2019
Nagoya Congress Center, Nagoya, Japan
Abstract Submission Deadline: 31 March 2019
Online Registration Deadline: 5 August 2019
Website: http://www.congre.co.jp/apcm-ispd2019/index.html

ISPD / EuroPD Joint Congress
2-5 May 2020
Scottish Event Campus (SEC), Glasgow, Scotland
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ISPD and EuroPD will be jointly hosting the 2020 Congress in Glasgow, Scotland, from 2-5 May. This will be the largest gathering of PD experts in Europe. It is expected to attract over 2,000 delegates from around the world.

The programme will aim to strengthen participants' knowledge of PD and Home Haemodialysis on a national, regional and international scale through a multidisciplinary programme. Outline topics include:

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The Quality of Life and Exercise Capacity of Peritoneal Dialysis Patients

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In addition to technical survival and mortality, health-related quality of life (HRQOL) is an important outcome in peritoneal dialysis (PD) patients who undergo dialysis at their home, with a large proportion of them being elderly. A previous study showed that a better HRQOL was associated with better technical and patient survival rates in PD patients [1]. We focused on reduced exercise capacity, which is prevalent and associated with poor all-cause mortality and technical failure in PD patients [2, 3]. In hemodialysis (HD) patients, HRQOL is adversely affected by physical function [4]; however, to the best of our knowledge, the impact of exercise tolerance on HRQOL has not yet been described in PD patients. Therefore, we assessed whether HRQOL positively correlated with exercise tolerance in PD patients [5].

We recruited 50 PD outpatients at our hospital from December 2016 to March 2018 (age and PD vintage, 63.8 ± 9.6 and 3.8 ± 2.8 years, respectively). Exercise capacity was assessed using the incremental shuttle walking test (ISWT) and by evaluating handgrip and quadriceps strength, whereas HRQOL was assessed using the Kidney Disease Quality of Life-Short Form (KDQOL-SF) questionnaire. Interestingly, a simple correlation analysis showed a strong positive relationship between ISWT and HRQOL scores, including not only “physical” subscales, such as physical functioning, physical role functioning, bodily pain, vitality, and physical component summary, but also “mental” or “kidney-specific” subscales, such as effects and burden of kidney disease, cognitive function, patient satisfaction, kidney disease component summary (KDCS), general health, and emotional role functioning. Conversely, the association of HRQOL with handgrip and quadriceps strength was relatively limited. Moreover, after adjustment for age, sex, and renal Kt/V value, all of which are believed to influence HRQOL, ISWT remained a positive predictor of all the HRQOL scores, which significantly correlated with ISWT by a simple correlation analysis. This finding indicates an independent relationship between ISWT, as an outcome of aerobic capacity, and HRQOL scores in PD patients, while muscle strength was not a good predictor of better HRQOL. It is likely that interventions promoting aerobic capacity will lead to better HRQOL and consequently will improve technical and patient survival [3, 4].

Although several studies have confirmed the beneficial effects of exercise on aerobic capacity and HRQOL in predialysis and HD patients, studies involving PD patients are limited [6–9]. To the best of our knowledge, to date, no randomized controlled trial (RCT) has exclusively included PD patients. Therefore, we designed an RCT including only PD patients to clarify the effects of exercise, primarily on physical functioning and HRQOL [10]. In contrast to the physical exercise programs performed under supervision during or between HD sessions in previous studies [7], we adopted a 12-week home-based exercise program and randomly assigned patients to an exercise group (n = 24; patients underwent aerobic exercise [AE] thrice weekly and resistance training [RT] twice weekly at home, considering the lifestyle of PD patients undergoing dialysis at their home) and a usual care group (n = 23; patients received no specific intervention). We observed that the distance in ISWT significantly improved in the exercise group compared with the usual care group (P = 0.02). Moreover, among the HRQOL subscales assessed using the KDQOL-SF questionnaire, KDCS (P = 0.03), physical role functioning (P = 0.01), emotional role functioning (P < 0.01), and role/social component summary (P < 0.01) significantly improved in the exercise group compared with the usual care group. Among the 22 patients in the exercise group who completed the intervention, the median percentage adherence to the prescribed AE and RT sessions was 50% (interquartile range, 16–91) and 86% (interquartile range, 69–100), respectively, based on data obtained from the received postcards. This limited adherence to sessions was a limitation of our trial, suggesting that our method of sending a postcard weekly to patients is not effective in improving their adherence to the unsupervised home-based exercise program. Conversely, in the subgroup analyses, ISWT significantly improved (P = 0.05) and handgrip strength was maintained (P = 0.06) in the high AE adherence group compared with the low AE adherence group; ISWT also improved (P = 0.08) in the high RT adherence group compared with the low RT adherence group. These findings indicated a dose–response relationship between adherence to the home-based exercise program and changes in physical functioning. To the best of our knowledge, this is the first RCT to indicate the beneficial effects of a 12-week home-based exercise program involving AE and RT exclusively in PD patients.

In summary, the study findings demonstrate a significant correlation between aerobic capacity and most of the HRQOL domains, including physical, mental, and kidney-specific domains [5]. Moreover, the study findings indicate that a home-based exercise program has beneficial effects, especially for improving aerobic capacity and HRQOL in PD patients, although continued adherence of PD patients to the program is a problem that must be solved [10]. Combined with the positive correlation between HRQOL or aerobic capacity and better technical and patient survival in PD patients, which has been reported previously [1, 3], an exercise program to improve aerobic capacity and HRQOL can improve these hard outcomes in PD patients. Future trials with long-term randomization are necessary to prove this hypothesis.
Again, we emphasize that we should focus more on HRQOL and exercise capacity as important outcomes in PD patients who undergo home-based dialysis, with a large proportion of them being elderly.

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Research News – Exit-Site Infection: A Comparison of Classification Systems

Perit Dial Int 2018; 38(6):462–463

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Exit-site infection is defined by the presence of purulent discharge with or without erythema of the skin at the catheter epidermal interface. There are 2 systems of classification of exit-site infections: Twardowski and Prowant's elaborate system [1] and a simple scoring system provided by the International Society for Peritoneal Dialysis (ISPD) [2,3]. The equivocal exit sites according to Twardowski and Prowant's system [1] represent the overlap between the overtly infected and obviously uninfected exit sites and are considered to indicate low-grade infection. Some equivocal exit sites improve spontaneously, but most progress to overt infection if untreated. In Twardowski's observation, in patients with equivocal exit sites, 38.4% developed peritonitis and catheter loss was seen in 23.7% [3].

When the ISPD system is taken into consideration, infec¬tion should be assumed with the exit-site score of ≥ 4 and when purulent discharge exists. However, when a comparison is drawn during clinical evaluation of an infected exit site, applying both scoring systems on the same patient, there is a possibility of a lack of clarity when the score is 3 points in the ISPD system, and equivocal in the Twardowski system.
In our cohort, 71 patients with end-stage renal disease (ESRD) on chronic peritoneal dialysis (CPD) for a minimum period of 6 months were included. The mean age was 48 years; there were 60 males and 38 diabetics. The mean duration of PD was 15.7 months. The incidence of exit-site infection was 0.3 per patient month. Pseudomonas aeruginosa was the aetiology of exit-site infection in 5 patients. Patients received 2 different classes of antibiotics as per the sensitivity report. The antibiotics were given for 3 weeks.

In our study, the exit-site categories accord¬ing to the Twardowski and Prowant's system [1] were, perfect: 36.6%, good: 33.8%, equivocal: 21.1%, and infection: 8.4%. According to the ISPD scoring system, it was < 4 points in 63 (88.7%) and > 4 points in 8 (11.2%). We encountered 11 exit sites categorized as equivocal under Twardowski and Prowant's system [1], which were recorded by the ISPD exit-site scoring system with 3 points. When the ISPD scoring system [2,3] was considered alone, these 11 exit sites would have passed as without infection, while the same 11 exit sites in the equivocal category of Twardowski and Prowant's system [1] were considered to indicate low-grade infection. In our patient group, on further follow-up of the patients with 15 equivocal exit-site categories, 5 (33.3%) patients developed peritonitis and there was catheter loss in 3 (20%). In the same set of patients, an ISPD exit-site score of 3 points was noted in 11. In patients with an ISPD exit-site score of 3 points, peritonitis developed in 3 patients (27.2%) with catheter loss in all of the 3.

In general, in PD practice in hospitals, Twardowski and Prowant's exit-site [1] classification system is used, while the ISPD exit-site scoring system [2,3] is practical to use in community visits with less experienced healthcare personnel. Nevertheless, when exit-site scoring is 3 points under the ISPD exit-site scoring system and it falls in the category of equivocal under the Twardowski and Prowant's exit-site clas¬sification, the physician should be vigilant about the possibility of development of peritonitis, and hence, patients need to be kept under periodic monitoring.

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APCM-ISPD
2019
The 9th Asia Pacific Chapter Meeting of
International Society for Peritoneal Dialysis
Date: September 5(Thu.) - 7(Sat.), 2019
Venue: Nagoya Congress Center (Nagoya, Japan)
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Supported: Japanese Society for Peritoneal Dialysis
The Japanese Society for Dialysis Therapy
Japanese Society of Nephrology
The Japanese Society for Pediatric Nephrology
Japan Academy of Nephrology Nursing
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Abstract Submission: December 1, 2018 - March 29, 2019
Online Registration: February 1, 2019 - August 5, 2019
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