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FROM THE EDITORIAL OFFICE

Dear All,

In this issue, we are delighted to have Dr. CW Yang from Taiwan to discuss the impact of obesity on peritoneal dialysis. In addition, Dr. DR Ryu will discuss the survival of older PD patients in Korea, and the group led by Dr. XH Wang will share their experience of providing dialysis nursing care in China.

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The 2014 ISPD Congress will be held this September. We look forward to seeing you in Madrid!

Sincerely,
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Body Mass Index and Mortality in Peritoneal Dialysis

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Obesity is known to be an established risk factor for increased morbidity and mortality in the general population[1, 2]. However, the relationship between body mass index (BMI) and mortality varies according to the comorbid illness[2]. In hemodialysis (HD) patients, previous studies have demonstrated that increased BMI is associated with decreased mortality, which is the opposite of that found in the general population[3].

In patients undergoing peritoneal dialysis (PD), the association between BMI and mortality is still controversial. Some studies have demonstrated that the higher BMI was associated with lower risk for death[4, 5], whereas other studies have demonstrated increased mortality in patients with obesity[6, 7] or equivalent mortality in patients with obesity compared with those with normal BMI[8, 9]. This discrepancy may be due to the differences in the study design or the population of the studies.

We recently analyzed the impact of BMI on mortality in the PD population in the Clinical Research Center (CRC) registry for End Stage Renal Disease (ESRD) cohort, which is an ongoing observational multicenter prospective cohort study in patients with ESRD from 31 centers in Korea.

A total of 900 prevalent PD patients were included in this analysis. BMI was calculated as weight (kg)/height (m^2). Body weight was measured without intraperitoneal dialysate. BMI values were categorized according to quartile groups, as follows: Quartile 1, BMI < 21.4 kg/m^2; Quartile 2, BMI = 21.4 – 23.5 kg/m^2; Quartile 3, BMI = 23.5 – 25.4 kg/m^2 and Quartile 4, BMI > 25.4 kg/m^2. The primary outcome was mortality.

In our study, patients in the higher BMI quartile were older and had more males than those in the lower BMI quartile. Diabetes as a cause of ESRD was more common in the highest BMI quartile, while glomerulonephritis as a cause of ESRD was more common in the lower BMI quartile. There was no difference in systolic and diastolic blood pressure, hemoglobin level, serum albumin level, serum total cholesterol level and subjective global assessment of nutritional status (SGA) among the BMI categories. Diabetes was more prevalent in the highest BMI quartile. In the Davies comorbidity score, low risk was more prevalent in lower BMI quartiles and intermediate risk was more prevalent in higher BMI quartiles. The modified Charlson comorbidity score was higher in the highest BMI quartile.

The median follow-up period was 24 months (interquartile range, 14-27 months). The leading causes of death were infectious diseases including peritonitis (43% of all deaths) and cardiovascular diseases (30% of all deaths). In the Kaplan-Meier survival analysis by quartile of BMI, survival was lower in patients with the lowest quartile of BMI compared to those with higher quartiles of BMI (p = 0.018, log-rank test). Survival in the second, third and fourth quartiles of BMI was equivalent. In the Cox regression analysis, the crude HR for mortality of BMI quartile 1 was 2.86 (95% CI, 1.33-6.12, p=0.007) and the adjusted HR was 3.00 (95% CI, 1.26-7.15, p=0.01) after multivariate adjustment for age, gender, diabetes and the Davies comorbidity score, implying that the lowest BMI quartile is a 3-fold strong risk factor compared to the reference category of BMI quartile 2 after adjustment for clinical variables. The crude HR for mortality of BMI quartile 3 and 4 was 1.32 (95% CI, 0.56-3.14, p=0.53) and 1.99 (95% CI, 0.89-4.46, p=0.10), respectively. The adjusted HR for mortality of BMI quartile 3 and 4 was 1.11 (95% CI, 0.43-2.85, p=0.83) and 1.64 (95% CI, 0.66-4.06, p=0.28) respectively; implying that higher BMI quartiles had no impact on survival compared to the reference category of BMI quartile 2 after adjustment for clinical variables.

Our study demonstrated that higher BMI groups were not associated with increased mortality compared to the reference category of BMI quartile 2, while the lowest BMI group was independently associated with increased mortality.

Our findings are consistent with some of the previous large studies for the association between BMI and mortality in patients with PD treatment[8]. Abbott et al reported in their retrospective large cohort study (the USRDS Dialysis Morbidity and Mortality Wave Study) that PD patients with the three highest quartiles of BMI had virtually identical mortality and PD patients with the lowest quartiles of BMI had lower survival over time compared to other categories of BMI*8*. On the other hand, our findings are in contrast to some of the previous studies, which demonstrated either beneficial or worse effects of obesity. Snyder reported in their retrospective large cohort study of the USRDS population that PD patients who were overweight or obese

had longer survival than those with lower BMI[5]. McDonald et al reported in their large retrospective cohort study of the Australia and New Zealand Dialysis and Transplantation Registry that obesity was independently associated with increased mortality in patients undergoing PD treatment[6]. The discrepancy between the findings of the previous observational studies may be due to the differences in the study designs or the populations of the studies. Our findings support the evidence that obesity has equivalent survival to PD patients.

An interesting point of this study is that the study populations were Asian patients with PD treatment. Asian populations have different association between BMI, percent of body fat, and health risk than do Western populations9. Asian populations have a higher percentage of body fat for a given BMI than do Western populations. Moreover, the prevalence of type 2 DM and cardiovascular risk factors are increased in parts of Asia even below BMI cut-off point of 25 kg/m^2, a value defined as being overweight by the current World Health Organization (WHO) classification. Thus, the WHO Expert Consultation recommended that BMI cut-off values in the definition of overweight and obesity should be lower for Asian populations than for those for Western populations.

Previous studies on the association between BMI and mortality in PD patients have been conducted primarily in Western populations. Compared to previous studies, the distribution of our study population according to BMI was different from that of Western populations. The mean BMI of our study (23.6 kg/m^2) was lower than that of previous studies with the Western patients undergoing PD treatment (mean BMI of 24.6-26.4 kg/m^2). The number of patients with obesity defined by the WHO classification (BMI ≥ 30 kg/m^2) was 34 (3.8%), which is lower than the percentage of patients with obesity in Western PD patients (10-22%). It seems that the WHO classification of BMI may not be appropriate for our study population. Therefore, we analyzed the impact of BMI for survival in our study populations by categorizing the study population by quartiles of BMI rather than by the WHO classification of BMI. Our results showed that BMI has a significant impact on survival when the study populations were categorized by quartiles of BMI rather than by the WHO classification of BMI, suggesting that the association between BMI and clinical outcomes may be identified along the continuum of BMI in Asian PD patients rather than the BMI cut-off point[9].

An important point of our study is that we recorded the information on the severity of comorbidities, which may be a confounder in the analysis of the association between BMI and mortality. The prevalence of DM and comorbidity scores such as the Davies comorbidity score and modified Charlson comorbidity score were higher in higher BMI groups than those in lower BMI groups in our study. These findings are similar with those in general populations[10]. After adjustment for the severity of comorbidities, the relationship between obesity and mortality was slightly attenuated but still persisted. This finding indicates that obesity may have an impact on mortality by some mechanisms that are independent of the severity of comorbidities in PD patients.

In conclusion, low BMI was found to be a significant risk factor for death in Korean PD patients. However, increased BMI was not associated with mortality in Korean PD patients.

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An Assessment of Survival among Elderly Korean Patients Initiating Dialysis: A National Population-Based Study

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The incidence of dialysis in elderly patients with end-stage renal disease (ESRD) has been growing in Korea and worldwide. According to the 2012 annual report from the Korean nationwide registry program, the percentage of dialysis patients at least 65 years of age had increased to 37.5% of overall dialysis patients(1). Elderly ESRD patients usually have higher comorbidity, such as cerebral and cardiovascular diseases, than non-elderly patients, and they also have specific age-related problems such as dementia, disability, and frailty.

Consequently, nephrologists confront many ambiguous issues regarding when and how to start dialysis in the elderly. To recommend dialysis therapy properly to elderly patients, doctors need baseline epidemiologic data on survival rates and the factors affecting mortality. To date, however, no studies have reported this data for elderly Korean ESRD patients. Therefore, we recently published an article on outcomes in elderly Korean ESRD patients initiating dialysis(2).

All data used in the study were obtained from the Korean Health Insurance Review and Assessment Service database; thereby we were able to identify every ESRD patient in the entire South Korean population and analyze the data for all ESRD patients who had started dialysis. We analyzed 11,301 patients (6,138 men) aged 65 years or older who initiated dialysis from 2005 to 2008 and followed up (median, 37.8 months; range, 3–84 months). The number of elderly

patients starting dialysis increased from 2,517 in 2005 to 3,232 in 2008. In addition, the proportion of peritoneal dialysis (PD) patients decreased significantly with increasing age: 21.7% (65-69), 18.3% (70-74), 15.8% (75-79), 14.4% (80-84), and 10.4% (≥85 years).

The unadjusted 5-year survival rate was 37.6% for all elderly dialysis patients, and the rate decreased with increasing age categories: 45.9% (65-69), 37.5% (70-74), 28.4% (75-79), 24.1% (80-84), and 13.7% (≥85 years). The multivariate Cox proportional hazard model revealed that age, sex, dialysis modality, type of insurance, and various comorbidities were independent predictors for mortality. In addition, survival rate was significantly higher in patients on hemodialysis (HD) than in patients on PD in the intention-to-treat analysis. The unadjusted 5-year survival rate was 39.3% for HD patients, whereas it was 30.5% for PD patients. In the multivariate analysis, the hazard ratio of HD versus PD was 0.75 (95% confidence interval 0.71-0.80; $P = 0.0000$). However, when we compared hazard ratios according to age category, the influences of PD as an initial modality, diabetes mellitus, and congestive heart failure on mortality sequentially decreased with aging. Age *per se* and the factors affecting the degree of disability such as peripheral vascular disease or hemiparesis were more significant with increasing age.

Although the debate continues on the choice of dialysis modality in elderly patients, HD is preferred over PD in many countries. Previous studies have revealed that HD provided better survival outcomes than PD in elderly patients, especially 180 days after dialysis initiation[3-6]. Similarly, the survival rate of Korean PD patients was comparable to that of HD in patients younger than 55 years, whereas PD was consistently associated with a higher mortality rate in older patients (55 years and older)[7]. These findings require a more judicious approach in considering PD as an initial dialysis modality in elderly patients.

However, we also need to consider the quality of life and life expectancy for each patient when choosing a dialysis modality. When HD is selected, patients must travel to a local HD unit thrice a week despite their poor ambulation. Additionally, caregivers usually need to accompany patients through every HD treatment. Patients are also likely to be vulnerable to HD-related complications such as intradialytic hypotension, resulting in hospitalization or other medical expenses. Therefore, personal independence would be considered the single largest benefit of PD[8, 9].

Although the present study showed that survival outcomes for PD were inferior to those for HD in elderly Korean patients, it should be recognized that age *per se* was the most potent risk factor for predicting mortality in elderly patients initiating dialysis. An increased mortality risk with PD would likely shorten life by only a few weeks to months in the very elderly[10].

These results cannot be extrapolated directly to other Asian countries due to differences in racial background and medical environment, such as reimbursement method or medical insurance programs. However, we hope that it can provide a relevant guide to an individualized strategy in elderly Korean ESRD patients.

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Nursing care of PD patients in China: An Overview

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As the steady worldwide rise in end-stage renal disease (ESRD) population continues[1], the peritoneal dialysis (PD) population rises due to reintegrating dialysis patients with high activities in daily life (ADL) into society as compared to hemodialysis (HD)[2]. The number of patients receiving PD treatment in China is approximately 16,000, and increasing each year[3]. Nurses are unable to give adequate care as they are faced with a very large population of patients. An overview of the work done by PD nurses in China is given below.

I. Routine work

a. For first-time placement of the patient line, PD nurses briefly explain to patients and their families the process of patient line placement, common postoperative discomforts and how to replace the solution bag. In the meantime, they distribute the Patient-At-Home-Guide, instructive pictures, log books, small pairs of scissors and other PD-related objects such as disconnect caps, blue clamps, catheter-exit-site care products etc. Following that, PD nurses ask the patients to go to the patient education room and give further instructions by showing them the PD teaching video provided by Baxter (repetition may be needed depending on the patient's comprehension of video

contents). Then nurses evaluate the patient's comprehension of PD-related knowledge and give specific instructions using the Patient-At-Home Guide, pictures and flipcharts. Before a patient's discharge, PD nurses test their theoretical PD knowledge (using self-designed questions) and solution bag replacement skills. Those patients who fail the test are not eligible for discharge and have to stay and receive further training.

b. For patients who come back to evaluate their peritoneal function after six months of PD, PD nurses normally replace their short tube as well as ask about their common discomforts when doing PD at home and whether they replace solution bags correctly. Meanwhile, nurses also pay moderate attention to a patient's psychosocial problems.

II. Addressing abnormal situations in time

When patients are being discharged, PD nurses give them a business card with the phone numbers of the PD doctor, PD nurse and PD center on it. If they come across problems during PD at home, they can call for help at any time. For problems that can be solved via telephone instructions such as a blocked drain line, abnormal drain color for newly-placed patient lines, etc., PD nurses address them immediately. For those that cannot be solved via telephone calls such as potential stomachaches, patients need to come to the hospital. For patients with peritonitis, hospital wards provide them with quick-admission services to make sure they are attended to in a timely manner.

III. Insufficiencies and prospects

At present, PD nurses are apparently short-staffed in China[4]. In addition, the quality of PD nurses ,especially their research ability, are relatively insufficient, resulting in a less than thorough and in-depth patient education, such as inadequate attention to the patient's quality of life, nutrition, hypertension management, anemia correction, renal osteopathy and cardiovascular events. No standardized measures for the effect of patient education, relatively low follow-up rates, and monotonous methods of follow-up (only telephone calls and outpatient follow-ups, and few home visits made by PD nurses) are all existing insufficiencies.

PD in China should gain support from all levels of health authorities to ensure there are sufficient PD nurses and standardize their selection and training process. Objectives of nursing quality management should be set and achieved. Scientific research in nursing care of PD patients should be strengthened. Last but not least, PD quality and management should be comprehensively improved[5].

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