

Executive Summary

Outcomes research of peritoneal dialysis and hemodialysis for end-stage renal disease

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□ Background

Patients and newly diagnosed patients who need dialysis or kidney transplantation show a growing tendency owing to an increase in ageing population and chronic diseases. According to the Korean data, it was reported that hemodialysis patients are 52,378 persons (87.4%) and peritoneal dialysis patients are 7,540 persons (12.6%) in 2013.

Although end-stage renal dialysis causes the huge burden in Korea, there is still a controversy in dialysis modality selection. Therefore, it is necessary to comparatively examine the trends in dialysis, medical expenses and clinical effectiveness of hemodialysis and peritoneal dialysis.

Objective

We provide scientific evidence regarding the choice of dialysis methods on the basis of the outcome such as clinical effectiveness, medical expenses, and quality of life in accordance with the dialysis methods in patients with end-stage renal dialysis.

Methods

To present scientific evidences about the choice of dialysis methods using the outcome study such as clinical effectiveness, medical expenses, and quality of life depending on the dialysis methods in patients with end-stage renal dialysis (ESRD), we investigated 1) the status of patients and newly dialysis patients on dialysis treatment and their medical service use, 2) the assessment of clinical effectiveness in hemodialysis (HD) and peritoneal dialysis (PD), 3) the quality of life and 4) the patient preference, 6) the budget impact analysis (BIA) was conducted using the health insurance claims data and the survey for ESRD patients.

Results

1. Analysis of the health insurance claims data

1) Trends in HD and PD

Regarding the prevalence of dialysis modality, HD sharply increased by 238.5% (19,940 to 67,492 persons) in 2015 compared to 2003, while the PD reported a 47.5% rise (7,182 to 10,595 persons) in the same periods. We also found the same tendency in the prevalence ratio of HD to PD according to year; its ratio in 2013 and 2015 was 73:27 and 86:14, respectively. The

medical expenditure of HD was KRW 2.47 trillion in 2015, while the PD was KRW 160 billion.

We summarized the result of patient received the same method for more than 90 days after the first dialysis as main results.

In this analysis, HD prevalence surged 280.4% (12,415 to 47,223 persons) in 2015 compared to 2003, while the increase rate of PD was only 37.5% (6,519 to 8,962 persons). The medical expenditure of HD reached KRW 1.12 trillion in 2015, up a 387.0% from 2003, and the increase rate of PD was only 108.3% (KRW 72 to 150 billion). The medical expenditure of both HD and PD showed a growing tendency over the years. However, the expense for single patient with HD were higher than the PD every year, KRW 4.5~8 million.

Compared with a 84.3% increase in the HD incidence in 2015 to 2003 (from 3,769 to 6,945 persons), the PD incidence decreased 27.1%, which was 2,102 in 2003 to 1,533 to 2015. Regarding the medical expenditure, HD increased by 241.5% in 2015 compared to 2003 (KRW 41 to 140 billion), but PD declined 5% (KRW 20 to 19 billion).

2) Clinical effectiveness of renal dialysis

A total of 96,626 eligible patients with ESRD were composed of 18,216 treated with PD, 78,410 treated with HD. The stratified propensity score matching considering the underlying characteristics of two groups were 18,213 patients in both PD and HD, respectively.

The crude mortality rates were 95.0 per 1000 patient-years (PY) in PD and 96.5/1000PY in HD. Compared with HD, PD was associated with increased risks of mortality (adjusted hazard ratio: 1.27, 95% CI: 1.24-1.31, p-value<0.0001) and MACCE (Major adverse cardiac and cerebrovascular events) rate (HR: 1.11, 95% CI: 1.06-1.16, p-value<0.0001). The results were similar in analysis of PS matching patients (HR: 1.18, 95% CI: 1.14-1.22, p-value <0.0001).

Subgroup analysis were performed according to year (2004-2009, 2010-2015), age (less than 65 years old, over 65 years old), diabetes (non-diabetic patients, diabetic patients), hospital type (tertiary General Hospital, general hospital, hospital, councillor) and crossing the diabetic and age (non-diabetic patients less than age 65, non-diabetic patients over age 65, diabetic patients less than age 65, diabetic patients over age 65). After PS matching, it was analyzed that there was no difference in the mortality between PD and HD in the 2010-2015 year (HR: 1.01, 95% CI: 0.94-1.09, p-value=0.790), non-diabetic patients less than age 65 group (HR: 1.08, 95% CI: 0.99-1.17, p-value=0.074), hospital group (HR: 1.28, 95% CI: 0.82-2, p-value=0.276) and, in other subgroups, the mortality risk was significantly higher in PD compared to HD (p-value <0.05).

The difference of the mortality between PD and HD was not significant in non-diabetic patients less than age 65 group as a result of both after and before match. Therefore, non-diabetic patients aged less than 65 were designated for the BIA, and the BIA were estimated altering the distribution of HD and PD.

2. Survey results on end-stage renal dialysis patients

As a result, the mean age was 48.3 in PD and 61.7 years old in HD. Other characteristic were statistically not significant. It was found that there was a significant difference in dialysis methods according to whether they have a job or not.

It was shown that the proportion of those who received the education for at least one of the dialysis methods was 98.7% in PD and 93.7% in HD, and the proportion of those who did not received such education was 1.3% in PD group and 6.3% in HD. For the educational intelligibility and satisfaction, the proportion of positive responses was higher in PD than in HD. In HD, only 13.2% of them relied positively concerning that if you received the education more specifically, you could change the modality.

In accordance with dialysis method were calculated using the EQ-5D. The weighted values of quality of life in PD among 301 persons in total were 0.86, and in HD were 0.80, indicating that those in PD were higher. According to dialysis period, the quality of life in PD group appeared higher than in HD.

3. Results of the budget impact analysis for end-stage renal dialysis

This study considered the budget impact of the modality changing in end-stage renal dialysis. Using the health insurance claims data from 2009 to 2015, after calculating the average rate of change of patients requiring dialysis treatment because of end-stage renal dialysis, we reflected it in the analysis. Also, in order to calculate medical expenses, targeting patients treated with HD or PD using the maintain the same modality for 90 days or more, medical expenses of patient and newly dialysis patients were divided. Moreover, in changing dialysis method, after altering the distribution of patients and newly dialysis patients in non-diabetic group aged less than 65 that there is no statistical difference in both two groups of cardiovascular disease leading to death and not leading to it in the analysis of clinical effects according to the scenarios, we estimated budget impact analysis.

The expenses included in the analysis were investigated by containing the reimbursement expenses borne in the National Health Insurance Corporation among medical expenses into the final analysis. The average increase rate of medical expenses from 2009 to 2015 was applied to their rate of change in calculating them after 2017.

In HD non-diabetes and aged less than 65 changes it to peritoneal dialysis (scenarios 1-4), the reduced expenses are about KRW 52 to 433.4 billion, showing that approximately 0.9% to 7.3% of the expenses to be paid for 5 years are cut down. In all scenarios, the financial saving effect is induced according to an increase in the number of PD, and the saving scale indicated a growing trend gradually as time goes on.

Conclusions

As the end-stage renal dialysis is an illness causing a great burden socio-economically as well as to patients and their family. Our study indicated that a decision making to prepare the most reasonable measure for taking care of dialysis patients is necessary, and thereby it will lead to an increase in patients' survival rate, improvement of quality of life, and reduction of medical expenses. There are limit of a retrospective observational study. It is considered that a national prospective data system should be established and further efforts to manage it systematically are required in the future.

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Key words

End-stage renal disease, Peritoneal dialysis, Hemodialysis, clinical effectiveness, budget impact