Icodextrin Reduces Mortality and the Drop-Out Rate in Japanese Peritoneal Dialysis Patients

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Although numerous reports have shown that the use of icodextrin solution, as compared with conventional dextrose solutions, provides various clinical benefits, data on the impact of icodextrin solution on mortality and drop-out are sparse (8–10). Thus, in the present study, we compared clinical outcomes in a large cohort of PD patients prescribed icodextrin or dextrose solution for the long dwell.

Patients and methods
In this cross-sectional analysis, we included 7808 patients across Japan who were using Baxter peritoneal dialysis (PD) solutions in 2004. Outcomes data were retrieved retrospectively from the Baxter Japan database. Essentially, the database tracks the delivery status of PD solutions based on patient prescriptions. At least one delivery of icodextrin in 2004 identified the patient in the records as an icodextrin user. Drop-out from PD could be assumed when procurement was stopped. Reasons for cessation of PD, such as transfer to hemodialysis (HD) or death of the patient, were retrieved and verified by a physician in charge. The annual HD mortality rate was calculated from the survival of patients (longitudinal data) given in the 2000 annual report of the Japanese Society for Dialysis Therapy (11). The relative risk for mortality on PD versus HD was calculated by dividing the accumulated annual mortality rate for the patients on PD up to the indicated dialysis year by the accumulated annual mortality rate for the patients on HD. Statistical analyses used the chi-square test. A \( p \) value below 0.05 was accepted as statistically significant.

Results
A total of 3007 patients used icodextrin at some time in 2004; 4701 patients had not used icodextrin during the same year. Figure 1 shows the drop-out rates of the patients on PD with and without icodextrin by number of years on dialysis. The average annual drop-out rate in patients using icodextrin (8.9%) was 39% lower than that in patients using dextrose (14.5%; \( p < 0.0001 \)). The average annual mortality rate for patients
using icodextrin was 51% lower than that in patients using dextrose (6.6% vs. 13.5%, \( p < 0.0001 \); Figure 2). The relative risk of death in the icodextrin group was consistently lower than that in the HD patients regardless of dialysis duration (Figure 3).

**Discussion**

Several reports have showed that the use of icodextrin solution is beneficial for PD patients in various ways (1–7). For example, because of superior ultrafiltration with icodextrin over the long dwell, extracellular water volume is reduced and a subsequent reduction in left ventricular volume has been reported (4,5). Favorable changes to adipocytokines and lipid profile have also been reported (6,7). However, only a few publications have reported the impact of icodextrin on mortality and time on therapy (8–10). We therefore analyzed data from the approximately 7800 PD patients in the Baxter Japan database, which represents almost 75% of the Japanese PD population. The rates of death and transfer to HD in the patients using icodextrin were both significantly lower than those in the patients not using icodextrin, which agrees with an earlier report from Spain (10). Data concerning the causes of death or reasons for transfer to HD were not included in the database used for our study; potential reasons for our findings of differences between the groups include differences in fluid status (4,5) and in rate of decline of residual renal function (4) and better peritoneal membrane preservation (3). Additionally, patient selection factors relative to icodextrin use may have also affected the results.

Although the longest duration on icodextrin was limited to 18 months in this study (because icodextrin was introduced in Japan in the middle of 2003), it is notable that use of icodextrin even in long-term patients—such as those on PD for more than 8 years—was associated with a lower mortality than that seen in patients not using icodextrin.

**Conclusions**

Despite the limitations of this study, such as the absence of demographic data, its cross-sectional nature, and the lack of data regarding cause of drop-out or death, the results indicate that, in comparison with dextrose solution, use of icodextrin solution for the long dwell significantly reduces both mortality and drop-out rate.

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**FIGURE 1** Annual transfer rate to hemodialysis (HD) by peritoneal dialysis (PD) duration. The annual transfer rate was calculated by dividing the number of patients transferred to HD by the total number of patients with the specified number of years on PD.

**FIGURE 2** Annual mortality rate by peritoneal dialysis (PD) duration. The annual mortality rate was calculated by dividing the number of patients who died by the total number of patients with the specified number of years on PD.

**FIGURE 3** Relative risk of death [the dotted line at 1 represents the risk of hemodialysis (HD)]. Relative risk was calculated by dividing the accumulated mortality rate for the specified number of years on peritoneal dialysis (PD) by specified years on HD from the Japanese Society of Dialysis Therapy data.
References


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