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Patients Initiating Peritoneal Dialysis Started on Two Icodextrin Exchanges Daily

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Patients with end-stage renal disease treated with peritoneal dialysis (PD) are often put on standard “one size fits all” regimens, despite having varying degrees of residual renal function (RRF). The present study reports our experience with initiation of PD using 2 icodextrin exchanges daily in patients with RRF corresponding to a weekly $Kt/V_{urea}$ of at least 1.0. Peritoneal and RRF $Kt/V_{urea}$ were tracked closely, and total $Kt/V_{urea}$ was maintained between 1.7 and 2.0. One patient developed a rash and was changed to 3 dextrose exchanges daily. All patients were satisfied with their treatment regimen, and no other adverse events or symptoms were reported.

Key words
Icodextrin, weekly $Kt/V$, dialysis initiation

Introduction
Deciding on the initial prescription for end-stage renal disease (ESRD) patients who start chronic peritoneal dialysis (PD) therapy requires that clinicians focus on patient preferences in addition to targeting and achieving an adequate dose of dialysis. Patient-centered medical care involves the active participation of individuals in the determination of their care by considering their personal preferences, cultural and social values, and family and personal lifestyle. The U.S. Institute of Medicine defines patient-centered care as "Providing care that is respectful of and responsive to individual patient preferences, needs, and values, and ensuring that patient values guide all clinical decisions" (1). In implementing a successful regimen and adequate therapy, patients need to be a part of the planning of the appropriate regimen.

It has been suggested that an adequate and acceptable dose of dialysis involves achieving a weekly $Kt/V_{urea}$ of at least 1.7. It has also been suggested that, compared with $Kt/V$ of 1.7 – 2.0, a delivered $Kt/V$ greater than 2.0 does not lead to improved outcomes (2–4) Furthermore, the deleterious effects on the peritoneum of unnecessary glucose exposure has to be considered in planning the PD regimen.

In the present paper, we describe our experience with PD initiation using a regimen involving 2 icodextrin exchanges daily, with the goal of accommodating patient desires, limiting dextrose exposure, and maintaining an adequate dose of dialysis.

Methods
We identified 7 patients who developed ESRD and who had residual renal function (RRF) representing a $Kt/V_{urea}$ greater than 1.0 at the start of dialysis. They were started on an initial dialysis regimen of 2 icodextrin exchanges daily, with a target $Kt/V$ of 1.7 – 2.0. All patients were informed that this use of icodextrin was off-label, and they agreed to the treatment regimen. Their RRF ($Kt/V_{urea}$) was closely tracked. Patients were routinely monitored during their monthly visits, with careful attention being paid to volume status, residual and peritoneal clearances, urine volume, general medical symptoms, and the effect of the regimen on their quality of life. Liver function tests were monitored monthly (5).

Results
As Table I shows, the mean age of the study population was 64.3 ± 9.8 years, and 86% were men. In all patients, measured RRF represented a weekly $Kt/V_{urea}$ exceeding 1.0. After the start of PD therapy, all patients achieved a total $Kt/V$ greater than 1.7 (peritoneal and RRF combined). One patient developed an icodextrin allergy (skin rash) and was changed to 3 dextrose exchanges daily.

At the time of writing, the study patients had been maintained on this regimen for 12.0 ± 1.4 months. The most recent mean weekly $Kt/V$ was 2.10 ± 0.29 Kwabena T. Awuah,† Nancy Gorban–Brennan,‡ Hima Bindu Yalamanchili,† Fredric O. Finkelstein†,‡,§

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(1.17 ± 0.25 from RRF, and 0.93 ± 0.15 from PD). Volume control has been excellent in all patients. No untoward symptoms have been noted, and no adverse events related to icodextrin have been reported (other than the 1 patient with rash). Liver function tests have all been normal.

All patients have reported a high degree of satisfaction with their treatment regimen. Only one requested a change in therapy (more details in next subsection) after loss of RRF. Two of the patients are employed full time, and one runs an antique business. These 3 patients appreciate the flexibility to accommodate changes in their work schedule. Three patients are frequent travelers, including trips to Europe.

Outcomes
One patient underwent living-donor (from his spouse) kidney transplantation after 10 months on the icodextrin regimen. One patient remained on 2 daily exchanges for 4 months and then, because of loss of RRF and personal preference, had to be transitioned to continuous cycling PD to achieve adequate dialysis. To achieve adequate dialysis after loss of RRF, the prescription in 3 patients was adjusted to 3 exchanges daily (2 icodextrin, 1 dextrose) after 6, 8, and 10 months. One patient died of a cardiovascular event after 10 months on the icodextrin regimen. The 7th patient has remained on 2 icodextrin exchanges daily for 14 months with adequate dialysis, volume control, and overall satisfaction with care.

Discussion
Patients with ESRD and significant RRF who initiate PD should have their prescription individualized, accommodating individual preferences and lifestyle.

Because no clinical advantage appears to accrue to a \( \text{Kt/V}_{\text{urea}} \) target greater than 2.0, limiting PD exchanges to target a \( \text{Kt/V}_{\text{urea}} \) of 1.8 – 2.0 is a reasonable approach for managing patients with good RRF (2–4). The use of 2 icodextrin exchanges daily appears to be a reasonable regimen; volume control can be well-maintained, and the timing of exchanges can be flexible because of the sustained ultrafiltration achieved with icodextrin (6). In addition, dextrose exposure can be limited, perhaps thus helping to preserve the integrity of the peritoneal membrane. Importantly, the 2 icodextrin exchanges give patients the flexibility to modify their treatment regimen to accommodate individual work and social needs. The challenge of this regimen is that as RRF declines, the dose of dialysis has to be increased to maintain adequacy; thus, careful tracking of RRF and \( \text{Kt/V} \) is most important.

Icodextrin is approved for only 1 exchange daily in ESRD patients, and thus, this use of icodextrin PD solution is off-label. However, at least 3 earlier publications have commented on the long-term use of 2 icodextrin bags daily, without adverse effects, in ESRD patients maintained on PD (7–9). Similarly, in the present study, aside from the 1 patient with rash (a well-documented potential problem with the use of icodextrin), all patients tolerated the 2 daily icodextrin exchanges without obvious problems. Volume status was well maintained, and the patients generally felt quite well.

Conclusions
Peritoneal dialysis with 2 icodextrin exchanges daily at initiation appears to be an effective treatment regimen for patients with good RRF (\( \text{Kt/V}_{\text{urea}} \) of least 1.0). Volume status can be well maintained, the flexibility of the regimen is appreciated by patients, and dextrose exposure can be limited. However, careful attention needs to be paid to RRF in these patients, and the dose of dialysis prescribed may need to increase as RRF declines.

Disclosures
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References
1 United States, National Academy of Sciences, Institute of Medicine. Crossing the quality chasm: a new health


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