LETTERS TO THE EDITOR

A Reason for Choosing Peritoneal Dialysis: Lessons After the Japan Earthquake and the Fukushima Nuclear Accident

To the Editor:

Recently Ghaffari\(^1\) described a safe and effective urgent-start peritoneal dialysis (PD) program. As the author discussed, PD provides outcomes similar to hemodialysis (HD) and has several advantages. In Japan, in addition to traditional PD therapy, HD/PD combination therapy, which comprises 5 or 6 days of PD combined with one HD session per week, is used for patients to control body fluid and remove solutes more effectively.\(^2\) The other advantage of the combination therapy is the availability of the treatment in emergency situations, such as natural disasters. The Japan earthquake in 2011 and subsequent Fukushima nuclear accident adversely affected dialysis patients not only in the destroyed and radioactively contaminated areas, but also in the adjacent areas. Medical resources were temporaril limited because of an increased influx of patients from the disaster zone, shortages of dialyzers and dialysates, and scheduled blackouts. In addition, patients experienced difficulty reaching hospitals due to traffic paralysis. At Kashiwa Hospital of Jikei University School of Medicine, 10 combination-therapy patients were forced to stop HD sessions for 2 weeks. However, because they could continue to perform PD even without being able to travel to a medical facility, their interdialytic body weight gain, serum urea nitrogen level, and creatinine and potassium levels were not significantly different before and after the earthquake (Table 1). Our experience shows the reliability of PD in emergency situations and should further encourage using PD as the initial modality of renal replacement therapy.

Keita Kimura, MD, PhD
Makoto Ogura, MD, PhD
Keitaro Yokoyama, MD, PhD
Tatsuo Hosoya, MD, PhD
The Jikei University School of Medicine
Tokyo, Japan

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Table 1. Body Weight Gain and Laboratory Measurements

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<tr>
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<th>Before Earthquake</th>
<th>After Earthquake</th>
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<tbody>
<tr>
<td>Body weight gain relative to dry weight (%)</td>
<td>2.4 ± 1.6</td>
<td>2.0 ± 1.3</td>
<td>0.6</td>
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<tr>
<td>Serum urea nitrogen (mg/dL)</td>
<td>57.9 ± 11.1</td>
<td>58.2 ± 17.0</td>
<td>0.9</td>
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<tr>
<td>Creatinine (mg/dL)</td>
<td>14.9 ± 1.9</td>
<td>15.6 ± 2.4</td>
<td>0.5</td>
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<tr>
<td>Potassium (mEq/L)</td>
<td>4.4 ± 0.8</td>
<td>4.5 ± 0.6</td>
<td>0.8</td>
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</table>

Note: Measurements of 10 combination-therapy patients were obtained at the beginning of hemodialysis sessions before and 2 weeks after the earthquake and are expressed as mean ± standard deviation. Conversion factors for units: serum creatinine in mg/dL to \(\mu\)mol/L, \(\times 88.4\); serum urea nitrogen in mg/dL to mmol/L, \(\times 0.357\). No conversion necessary for serum potassium in mEq/L and mmol/L.

References


In Reply to ‘A Reason for Choosing Peritoneal Dialysis: Lessons After the Japan Earthquake and the Fukushima Nuclear Accident’

Natural disasters, especially those that affect transportation, electricity, and water supplies, highlight the dangers posed to patients with end-stage renal disease (ESRD) who are treated by hemodialysis (HD). Within the United States, Hurricane Katrina affected close to 6,000 dialysis patients. Despite evacuation plans, 44% of HD patients displaced by Katrina reported missing at least one HD session, whereas 16.8% reported missing 3 or more sessions.\(^1\)

Kimura et al\(^2\) describe their experiences during the 2011 Japanese earthquake. In this natural experiment, 10 Japanese patients with ESRD who previously were treated with a combination of HD and peritoneal dialysis (PD) were forced to stop HD treatment for 2 weeks, but because they were able to continue PD treatment, there were no untoward results. Consequently, the authors advocate for combination therapy as well as PD as an initial modality of dialysis.\(^2\) With more than 92% of all patients with ESRD in the United States receiving in-center HD, practitioners tend to forget the main advantages of PD: technique simplicity and patient independence. Continuous ambulatory PD is well suited for patients with ESRD during natural disasters because it does not require electricity or transportation to a dialysis facility and can be performed easily by most patients (or family members). This is just one more reason to support a “PD-first” model for dialysis services, especially for patients in areas at risk of natural disasters.

Arshia Ghaffari, DO, MA, MBA
University of Southern California
Los Angeles, California

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References


Renal Replacement Therapy Dosing in Acute Kidney Injury

To the Editor:

We read with interest the review by Vijayan and Palevsky concerning renal replacement therapy (RRT) dosing in acu
kidney injury (AKI). The authors state that intermittent hemodialysis can be provided every day if the per-session $K_t/V_{urea}$ is at least 1.2. This proposition is endorsed by the International Consensus Conference in Intensive Care Medicine in their official statement on the prevention and management of AKI in intensive care units. The recently published KDIGO (Kidney Disease: Improving Global Outcomes) Clinical Practice Guideline for Acute Kidney Injury recommends achieving a $K_t/V_{urea}$ of 3.9 per week. Vijayan and Palevsky also highlight the usefulness of routinely monitoring $K_t/V_{urea}$ or urea reduction ratio.

In a prospective single-center study, we monitored the delivered RRT dose in 40 septic patients with AKI over the course of 178 intermittent hemodialysis sessions by automatically measuring RRT dose. In order to achieve a median $K_t/V_{urea}$ of 1.2, the median treatment duration to nearly 5 hours with a median blood flow of 260 mL/min. The discrepancy between prescribed and delivered $K_t/V_{urea}$ values is consistent with previous studies. Monitoring the delivered dose in real time and adjusting the dialysis settings during the session may allow for higher delivered dialysis dosages.

### Table 1. Characteristics of 178 Intermittent Hemodialysis Sessions

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Median (25th-75th percentile)</th>
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<tr>
<td>Session length (min)</td>
<td>250 (240-300)</td>
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<tr>
<td>Blood flow (mL/min)</td>
<td>243 (224-265)</td>
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<tr>
<td>Urea Predialysis (mmol/L)</td>
<td>25.3 (19.6-33.1)</td>
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<tr>
<td>Urea Postdialysis (mmol/L)</td>
<td>10.2 (7-14)</td>
</tr>
<tr>
<td>Urea reduction ratio</td>
<td>0.59 (0.5-0.68)</td>
</tr>
<tr>
<td>$K_t/V_{urea}$</td>
<td>1.13 (0.84-1.27)</td>
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Note: Intermittent hemodialysis was performed through a 12F triple lumen catheter with a polysulfone membrane (ASAHI APS Series, model APS-21U) with a surface area of 2.1 m². Dialysate flow was set at 500 mL/min.

### References


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### Correspondence

Anitha Vijayan, MD
Washington University in St Louis
St Louis, Missouri

Paul M. Palevsky, MD
VA Pittsburgh Healthcare System and University of Pittsburgh
Pittsburgh, Pennsylvania

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### References