TITLE:  NxStage Home Hemodialysis Use in Remote or Rural Settings with Well Water: Clinical Effectiveness, Cost-Effectiveness, and Guidelines

DATE:  28 November 2014

RESEARCH QUESTIONS

1. What is the clinical effectiveness of the NxStage home hemodialysis system for patients in rural or remote areas who use well water?

2. What is the cost-effectiveness of using the NxStage home hemodialysis system for patients in rural or remote areas who use well water?

3. What are the guidelines associated with the use of the NxStage home hemodialysis system with well water?

KEY FINDINGS

No relevant literature was identified regarding the use of NxStage home hemodialysis use in remote or rural settings with well water.

METHODS

A limited literature search was conducted on key resources including PubMed, Scopus, The Cochrane Library (2014, Issue 11), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and November 24, 2014. Internet links were provided, where available.

SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.
Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Selection Criteria</th>
<th>Description</th>
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<tbody>
<tr>
<td>Population</td>
<td>Patients on home hemodialysis using well water</td>
</tr>
<tr>
<td>Intervention</td>
<td>NxStage home hemodialysis</td>
</tr>
<tr>
<td>Comparator</td>
<td>Other home hemodialysis units (including, but not limited to, Fresenius and Gambro)</td>
</tr>
<tr>
<td>Comparator</td>
<td>None</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Clinical effectiveness (e.g., 65% clearance rate, length of time to make dialysate, number of cartridges required)</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Safety (harms)</td>
</tr>
<tr>
<td>Study Designs</td>
<td>Guidelines</td>
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</tbody>
</table>

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

No relevant literature was identified regarding the use of NxStage home hemodialysis use in remote or rural settings with well water.

References of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

No relevant literature was found regarding the use of NxStage home hemodialysis use in remote or rural settings with well water; therefore, no summary can be provided.
REFERENCES SUMMARIZED

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified.

Randomized Controlled Trials
No literature identified.

Non-Randomized Studies
No literature identified.

Economic Evaluations
No literature identified.

Guidelines and Recommendations
No literature identified.

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APPENDIX – FURTHER INFORMATION:

Non-Randomized Studies

NxStage – Sterile Dialysis Fluid


Recent evidence from adult hemodialysis (HD) patient studies reveal improved biochemical control and reported health-related quality of life after transition from conventional thrice weekly to daily home maintenance HD treatment. Published pediatric frequent dialysis experiences demonstrate similar improvement but all used conventional HD machines, which employ a treated municipal water supply, thereby frequently exposing patients to proinflammatory components. We report our pediatric experience with six-times-weekly HD using the NxStage system, which uses sterile dialysis fluid to provide dialysis in the home or center setting. Four patients (weight range 38-61.4 kg) completed the 16-week study. Patients exhibited progressive reductions in casual pretreatment systolic and diastolic blood pressures, discontinuation of antihypertensive medications, and decreased blood pressure load by ambulatory blood pressure monitoring. Mean serum phosphorus improved without change in phosphorus binder medication, and all three patients with a normalized protein catabolic rate <1 g/kg per day at the beginning of the study improved to a normalized protein catabolic rate (nPCR) of >1.1 g/kg per day. Patients reported no adverse effects. Variable changes in proinflammatory cytokine levels were observed. We suggest that frequent HD with the NxStage system be considered for children who would benefit from home-based maintenance dialysis.

Review Articles

See: Table 4, page 18


To improve the quality of life (QOL) of patients with renal failure who are on dialysis, we have been working to promote home hemodialysis (HHD), but it has not come into widespread use at present because of various problems, including limitations of the equipment, the large proportion of elderly patients, and difficulty performing self-care. With regard to problems with the equipment, dialysis equipment for home use has not yet been approved in Japan, so equipment designed for medical facilities has to be used for home dialysis. Such equipment is bulky and occupies living space, as well as involving the cost of home renovation and the need for a caregiver. The NxStage System One (NSO)
artificial kidney has served advantages for HHD compared with conventional equipment, since it is compact, portable, and easy to operate (especially for preparation and cleaning), does not require a water supply, occupies less living space, and reduces the need for renovation of the home. Other advantages of the NSO include improvement of QOL by saving time travelling to hospitals and helping patients to participate in social activities. In addition, HHD with the NSO can improve sleep disorders, the restless legs syndrome, and depressive symptoms, resulting in a good outcome. Moreover, HHD with the NSO reduces the need for drugs, such as antihypertensive medications and erythropoietin, possibly leading to saving of healthcare costs.

Clinical Practice Guidelines – Methodology Uncertain


Additional References