



The End Stage
Renal Disease
Network Of Texas

MEMO

To: Administrators, Head Nurses, Clinical Managers
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Subject: Non-Standard Bath Use in Adult Chronic Hemodialysis

The Medical Review Board (MRB) has developed these recommendations regarding the use of non-standard bath use in the adult chronic outpatient hemodialysis facilities. Use of any non-standard bath composition (ie. Other than a 2.0 mEq/L K+, 2.5 mEq/L Ca++), requires appropriate monitoring and oversight protocols in order to maintain patient safety.

As part of the effort at maintaining patient safety please utilize this document in your internal Quality Improvement process. The following steps will provide a guideline for incorporation of the applicable portions of the recommendations:

- 1) Review the document and your current facility guidelines/protocols regarding non-standard bath compositions in your Quality Management meeting.
- 2) Discuss all components and issues with Medical Director and Medical Staff.
- 3) If an opportunity for improvement of patient safety exists please incorporate any applicable item(s).

The Quality Improvement team at the ESRD Network is always available to answer questions, provide assistance and work in collaboration with the facilities. Please do not hesitate to contact us.



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MEDICAL REVIEW BOARD SPECIAL PROJECT

RECOMMENDATIONS FOR MANAGING ADULT HEMODIALYSIS PATIENTS USING VARIABLE NON-STANDARD DIALYSATE BATHS

The MRB developed these recommendations in response to reports from the Texas Department of State Health Services about potential serious adverse events related to the use of low potassium and/or low calcium dialysate baths.

Objectives

- Heighten awareness of the need for continuous surveillance of serum lab values when a variable non-standard electrolyte bath composition is utilized (i.e., other than 2 mEq/L K^+ , 2.5 mEq/L Ca^{++}).
- Ensure that facilities utilizing variable non-standard electrolyte baths (i.e. baths with a higher or lower potassium or calcium content than the standard electrolyte bath) have monitoring and oversight protocols in place to maintain patient safety.
- Ensure that facility monitoring and oversight protocols for variable non-standard electrolyte baths emphasize the need for a comprehensive pre-dialysis nursing assessment.
- Draw attention to the specific precautions required for patients with cardiotonic medications that are sensitive to serum electrolyte shifts (i.e., digitalis)

Background

- Based upon review of Texas Department of State Health Service referrals, it is apparent to the MRB that there are chronic, outpatient hemodialysis centers using variable non-standard dialysate baths without appropriate monitoring and oversight protocols to maintain patient safety, for example:
 - Patients on low K^+ baths are receiving monthly serum K^+ monitoring, rather than the MRB-recommended weekly or bi-weekly serum K^+ monitoring.
 - Low K^+ and/or Ca^{++} baths are not being changed when serum K^+ and/or serum Ca^{++} normalizes.
 - Low K^+ baths are being used on patients receiving cardio-tonics; eg; Digitalis, Digoxin, Lanoxin.

MEDICAL REVIEW BOARD RECOMMENDATIONS

A formal protocol should be developed by the Medical Director and the Medical staff and utilized for the management of adult hemodialysis patients using variable non-standard dialysate baths.

The MRB recommends that you consider including the following in your facility protocol:

1. To facilitate communication between members of the interdisciplinary team, the MRB recommends that facilities implement processes that empower the RN and RD to participate in the management of serum electrolyte levels (i.e., potassium, calcium, magnesium, etc.).
2. Establish high/low serum electrolyte values for potassium, calcium, magnesium, etc. that precipitate mandatory review.
3. Education of direct care staff that emphasizes:
 - PRE-TREATMENT assessment of acute or chronic health issues that can alter potassium and/or calcium levels, (i.e., vomiting, diarrhea, changes in medications, use of citrate products).
 - PRE-TREATMENT assessment of patient's physical status, in relation to these acute or chronic health issues, as well as patient responses to questions about changes in eating habits, GI symptoms, etc.
 - Recognition of acute or chronic health issues that necessitate PRE-TREATMENT nursing and/or physician assessment.
 - Importance of reporting these acute or chronic health issues to the Charge Nurse BEFORE DIALYSIS IS INITIATED.
 - References for causes/signs and symptoms of electrolyte imbalances are available in *Contemporary Nephrology Nursing: Principles and Practices, 2nd Edition*.
4. Systematic methods for identifying patients dialyzing on variable non-standard dialysate baths, to facilitate physician assessment during rounds. For example:
 - Prominent notice on patient treatment sheet
 - Color coded dialysate jugs
 - List of patients dialyzing on special dialysate
 - Identification of patients returning from hospitalization
 - Established laboratory "panic values"
5. Potassium (K⁺)
 - All patients dialyzing on a nonstandard Potassium (K⁺) bath require additional laboratory monitoring
 - Use of 0 (Zero) K⁺ dialysate in outpatient settings is **NOT** regarded as safe practice
 - Goal for pre-dialysis serum Potassium (K⁺) is 4.0 – 5.5 mEq/L on monthly lab reports and baths should be adjusted to achieve this goal
 - All patients on nonstandard bath should have dietary counseling, access evaluation and medical evaluation done before patient is routinely placed on a nonstandard bath
 - If a patient requires a routine nonstandard bath, reevaluation should be done at regular intervals
 - Patients on cardiotonics (Digoxin, Digitalis, Lanoxin, etc.) should be given careful consideration when utilizing any of the low Potassium (K⁺) baths
6. Calcium (Ca⁺⁺):
 - High Calcium (Ca⁺⁺) levels should be given additional consideration in all patients on cardiotonics

Professional Knowledge

- "K⁺ free dialysate may produce rapid K⁺ fluxes along with a higher incidence of cardiac arrhythmias"
- "K⁺ free dialysate should be avoided because its ability to enhance K⁺ removal is modest in comparison with dialysate containing 1 mEq/L K⁺."
- "Pt's with known cardiac disease and perhaps other pt's such as those with concurrent hypomagnesemia or hypocalcemia AND those receiving Digitalis, are very likely at greater risk for hypokalemia-induced arrhythmia. The use of dialysate with a higher K⁺ concentrate (>2 mEq/L) is advisable, if possible in such pt's."

Dialysis and Transplantation; Owen, Pereira, Sayegh; WB Saunders, 2000

- " The risk of dialysis- associated digitalis cardiotoxicity may be minimized by elevating the bath K⁺ concentration to 3-3.5 K⁺mEq/L ."
- "Although severe hypokalemia may provoke rhythm disturbances, most pt.'s tolerate a bath K⁺ content of 2 mEq/L K⁺ without untoward effect."

Dialysis Therapy; Nissenson & Fine;1993

- "Arrhythmias occurring primarily during the dialysis session: Associated with the use of Digitalis preparations: This group is at the highest risk of arrhythmia. Electrolyte shifts during hemodialysis should be minimized, ensuring that serum K⁺ does not fall below 3.5mEq/L. Dialysate potassium may need to be increased to 3.0 or 3.5 mEq/L, restricting dietary K⁺ to avoid pre-dialysis hyperkalemia."
- "The usual dialysis solution potassium level is 2.0 mEq/L unless the patient's usual pre-dialysis plasma potassium concentration is less than 4.5-5.0, or unless the patient is receiving digitalis. In the later two instances, the dialysis solution potassium level should usually be 3.0 mEq/l."

Handbook of Dialysis; Daugirdas & Ing; 1994.