



Complete Summary

GUIDELINE TITLE

Minerals in pre-dialysis patients.

BIBLIOGRAPHIC SOURCE(S)

Caring for Australasians with Renal Impairment. Minerals in pre-dialysis patients. Nephrology 2005;10(Suppl 5):S195-7.

Voss D. Minerals in pre-dialysis patients. Westmead NSW (Australia): CARI - Caring for Australasians with Renal Impairment; 2005 Dec. 7 p. [3 references]

GUIDELINE STATUS

This is the current release of the guideline.

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SCOPE

DISEASE/CONDITION(S)

Chronic kidney disease (CKD)

GUIDELINE CATEGORY

Evaluation
Management

CLINICAL SPECIALTY

Family Practice
Internal Medicine

Nephrology
Nutrition

INTENDED USERS

Dietitians
Physicians

GUIDELINE OBJECTIVE(S)

To summarise the recommended daily intake of minerals: iodine, copper, zinc, selenium, aluminium, magnesium, chromium, lead, nickel, rubidium, strontium, tin, vanadium and silicon and to assess whether there is an association between morbidity, mortality and abnormalities measured in these minerals, including blood test/plasma, serum levels and dietary intakes

TARGET POPULATION

Patients with chronic kidney disease

INTERVENTIONS AND PRACTICES CONSIDERED

Evaluation

1. Assessment of dietary intake of minerals
 - Copper
 - Zinc
 - Selenium
 - Aluminum
2. Assessment for signs and symptoms of:
 - Copper overload
 - Zinc deficiency
 - Selenium deficiency
 - Aluminum overload

Management/Treatment

1. Use of recommended daily allowances for the general population, with special consideration of aluminum, copper, zinc, and selenium
2. Cautious use of agents containing aluminum

MAJOR OUTCOMES CONSIDERED

- Morbidity
- Mortality
- Serum levels of minerals

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Databases searched: Medical Subject Heading (MeSH) terms and text words for kidney disease were combined with MeSH terms and text words for minerals then combined with the Cochrane highly sensitive search strategy for randomised controlled trials and search filters for identifying prognosis and aetiology studies. The search was carried out in Medline (1996–November Week 2, 2003). The Cochrane Renal Group Trials Register was also searched for trials not indexed in Medline.

Date of searches: 27 November 2003.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Level I: Evidence obtained from a systematic review of all relevant randomized controlled trials (RCTs)

Level II: Evidence obtained from at least one properly designed RCT

Level III: Evidence obtained from well-designed pseudo-randomized controlled trials (alternate allocation or some other method); comparative studies with concurrent controls and allocation not randomized, cohort studies, case-control studies, interrupted time series with a control group; comparative studies with historical control, two or more single arm studies, interrupted time series without a parallel control group

Level IV: Evidence obtained from case series, either post-test or pretest/post-test

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Comparison with Guidelines from Other Groups
Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Recommendations of Others. Recommendations regarding mineral supplementation in patients with chronic kidney disease from the following groups were discussed: Kidney Disease Outcomes Quality Initiative, British Renal Association, Canadian Society of Nephrology, and European Dialysis & Transplant Nurses Association/European Renal Care Association.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions for the levels of evidence (I–IV) can be found at the end of the "Major Recommendations" field.

Guidelines

Agents containing aluminium should be used with caution in predialysis patients.
(*Level II evidence*)

Suggestions for Clinical Care

(Suggestions are based on Level III and IV evidence)

- The recommended daily allowances for the general population should be used as a basis for the chronic kidney disease (CKD) population subgroup. Aluminium, copper, zinc, and selenium are special cases. (**Opinion**)

Copper

Deficiency does not appear to occur in renal failure. Copper may accumulate in CKD but it rarely increases to levels that are problematic. Apart from the situation of symptoms or signs suggestive of copper overload, and laboratory test confirmation in a particular patient, there is inadequate evidence to recommend routine measurement of copper in CKD patients.

Zinc

Zinc is one of the most important trace elements and is a component of many metabolic metalloenzymes. Zinc levels fall in CKD; the cause of the low levels has not been clarified. Dietary protein is a major source of zinc and limited protein intake due to low-protein diets or the anorexia of CKD may contribute to a low zinc level. Apart from the situation of symptoms or signs suggestive of zinc deficiency, and laboratory test confirmation in a particular patient, there is inadequate evidence to recommend routine measurement or dietary supplementation with zinc in those with CKD. The regular monitoring of serum zinc levels in patients with CKD who are following a protein-restricted diet is recommended.

Selenium

Similar to zinc, proteins are a rich source of selenium. Diets can be deficient in selenium in areas where the natural supply (in soils) of selenium is poor (e.g., New Zealand). Deficiency in selenium may be associated with cardiovascular disease, skeletal muscle myopathy, anaemia and problems with immune function. Selenium is renally excreted, but it is unknown how much selenium accumulates in CKD.

Selenium has a small therapeutic window. Selenium toxicity occurs when the soils are rich in selenium (e.g., some parts of the United States), when excess oral intake from naturopathy therapies has occurred, or from hyperalimentation.

Apart from the situation of symptoms or signs suggestive of selenium deficiency, and laboratory test confirmation in a particular patient, there is inadequate evidence to recommend routine measurement or dietary supplementation with selenium in CKD.

Regular monitoring of serum selenium levels in patients with CKD who are following a protein-restricted diet, especially in New Zealand, is recommended.

Aluminium

Aluminium clearance is reduced in renal failure. Aluminium absorption from the gastrointestinal tract can be enhanced in the presence of citrate, and so citrate-containing agents (e.g., sodium citrate) should be avoided in patients concurrently

being administered aluminium-containing phosphate binders. Apart from the situation of symptoms or signs suggestive of aluminium overload and laboratory test confirmation in a particular patient, or patients on aluminium phosphate binders, there is inadequate evidence to recommend routine measurement of aluminium in patients with CKD.

Other Trace Elements/Minerals

Elevated serum levels of chromium, lead, silicon, strontium, tin, and vanadium, and reduced serum levels of nickel and rubidium have been observed in CKD patients. The clinical significance of this is not known.

Definitions:

Levels of Evidence

Level I: Evidence obtained from a systematic review of all relevant randomized controlled trials (RCTs)

Level II: Evidence obtained from at least one properly designed RCT

Level III: Evidence obtained from well-designed pseudo-randomized controlled trials (alternate allocation or some other method); comparative studies with concurrent controls and allocation not randomized, cohort studies, case-control studies, interrupted time series with a control group; comparative studies with historical control, two or more single arm studies, interrupted time series without a parallel control group

Level IV: Evidence obtained from case series, either post-test or pretest/post-test

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate supplementation of minerals in pre-dialysis patients

POTENTIAL HARMS

Not stated

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Implementation and Audit

1. A blood test for the levels of selenium and zinc if dietary levels are low (e.g., low soil content or on protein-restricted diet) should be performed at least once prior to pharmaceutical supplementation should occur. Regular monitoring thereafter is recommended.
2. If there is a clinical suspicion of copper overload disease, then serum copper levels should be checked. There is otherwise no recommendation for routine copper measurement in renal failure.
3. Serum aluminium levels should be checked at least 3-monthly if the patient is on regular dosing of oral aluminium-containing medications – as either a phosphate binder or antacid medication.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2005 Dec

GUIDELINE DEVELOPER(S)

Caring for Australasians with Renal Impairment - Disease Specific Society

SOURCE(S) OF FUNDING

Industry-sponsored funding administered through Kidney Health Australia

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Author: David Voss

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

All guideline writers are required to fill out a declaration of conflict of interest.

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Caring for Australasians with Renal Impairment Web site](#).

Print copies: Available from Caring for Australasians with Renal Impairment, Locked Bag 4001, Centre for Kidney Research, Westmead NSW, Australia 2145

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- The CARI guidelines. A guide for writers. Caring for Australasians with Renal Impairment. 2006 May. 6 p.

Electronic copies: Available from the [Caring for Australasians with Renal Impairment \(CARI\) Web site](#).

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on March 31, 2008. The information was verified by the guideline developer on June 11, 2008.

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