Dietary iodine restriction in preparation for radioactive iodine treatment or scanning in well-differentiated thyroid cancer: a systematic review

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CRD summary
The authors concluded that a one- to two-week low-iodine diet before I-131 therapy or scanning was preferred as a low-iodine diet was found to reduce iodine measurements, increase radioactive I-131 uptake and possibly improve efficacy of I-131 treatment. The authors' conclusions reflect the evidence presented, but small sample sizes and potential publication bias make the reliability of the conclusions uncertain.

Authors' objectives
To assess the effect dietary iodine restriction before radioactive iodine on the efficacy of thyroid remnant ablation (or elimination of any residual disease with radioactive iodine I-131 treatment), urinary iodine measurements, radioactive iodine kinetics and long-term thyroid cancer outcomes in the treatment of well-differentiated thyroid cancer.

Searching
MEDLINE and EMBASE were searched (up to July, 2009). Search terms were reported. Reference lists of identified relevant publications (clinical practice guidelines, primary studies) were handsearched. Clinical content experts were contacted. Only papers published in English were considered. Unpublished abstracts were excluded.

Study selection
Published studies (randomised controlled trials, systematic reviews, cohort studies, cross-sectional studies, case series) that assessed use of a low-iodine diet in preparation for radioactive iodine treatment or scanning in patients with well-differentiated non-medullary thyroid carcinoma who had undergone thyroidectomy were eligible for inclusion. Eligible interventions were those where an iodine-restricted diet was compared to no such diet or a variation of the diet. Both internal and external controls were considered; further details reported in the paper.

The primary outcome measure was efficacy of remnant ablation or elimination of any residual cancer or a stimulated thyroglobulin measurement less than 2ug/L or a combination. Secondary outcomes were urinary iodine measurements, radioactive iodine kinetics and long-term thyroid cancer outcomes.

All the included studies were conducted in high-income settings. Enrolled patients were reported to have either distant metastatic thyroid cancer or residual disease in about half of the studies. Most studies allowed dietary intake of iodine 50ug/day or less for one to two weeks. Timing of cessation of low-iodine diet was generally by radioactive iodine administration or scanning. Methods of counselling patients were varied (physician counselling, written dietary instructions, use of dietician). None of the included studies assessed long-term recurrence or mortality rates after initial follow-up radioactive iodine scan.

Two reviewers independently selected studies for inclusion; disagreements were resolved through discussions.

Assessment of study quality
Two reviewers independently assessed the quality of included studies using criteria of study type, type of control group comparison, setting (single centre or multicentre), blinding or independent confirmation of study outcomes, reports of loss to follow-up and descriptions of statistical methods. A third reviewer checked the accuracy of the quality assessments.

Data extraction
Two reviewers independently extracted data on interventions and pre-specified outcome measures; a third reviewer checked the accuracy of abstracted data.

Methods of synthesis
Study results were combined in a narrative synthesis.

**Results of the review**
Eight studies were included (n=660 patients, range three to 252). Six studies provided longitudinal cohort data and two provided cross-sectional data. Study quality was varied: only one study reported blinding and independent outcome assessment and losses to follow-up were generally not reported.

Only two studies assessed the effect of a low-iodine diet on the efficacy of radioactive iodine treatment or remnant ablation. One study reported significantly higher ablation rates in patients following an low-iodine diet compared to controls at six months; no effect of low-iodine diet was found in another study.

Overall, low-iodine diets were found to reduce urinary iodine measurements and increase I-131 uptake or lesional radiation compared to regular diets.

**Authors' conclusions**
Use of a one to two week low-iodine diet before I-131 therapy or scanning was preferred as low-iodine diets were found to reduce iodine measurements, increase radioactive (I-131) uptake and possibly improve efficacy of I-131 treatment in well-differentiated thyroid cancer.

**CRD commentary**
The review inclusion and exclusion criteria were defined. Two major databases were searched. No attempts were made to search for unpublished studies and unpublished abstracts were excluded, so there was a risk of publication bias. Only studies published in English were considered, so language bias could not be ruled out. Review processes were done in duplicate and this minimised risks of reviewer error and bias. Study quality was assessed using appropriate criteria and the results were used to inform synthesis of findings. The decision to combine study results narratively was appropriate given significant study differences. The authors acknowledged limitations due to small sample sizes and poor study quality.

The authors’ conclusions reflect the evidence presented, but small sample sizes and potential publication and language biases make the reliability of the conclusions uncertain.

**Implications of the review for practice and research**
**Practice:** The authors stated that, subject to some uncertainty, it appeared reasonable for clinicians to recommend dietary iodine restriction for one to two weeks before radioactive iodine treatment or scanning.

**Research:** The authors stated that randomised controlled trials are needed to identify optimal daily dose restriction for dietary iodine, diet duration and impact on long-term outcomes, particularly on remnant ablation or treatment of residual or metastatic disease. Studies should closely monitor potential side-effects. Further studies should assess the effects of a longer low-iodine diet duration (or different stringency of restriction) in patients who received recombinant human thyrotropin.

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**Bibliographic details**

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.