INPLASY

Safety of the Use of Herbal Medicine in Thyroid Cancer from the Perspective of Impact on Iodine Uptake and Sodium-Iodine Symporter: A Protocol for a Scoping Review and Data-mining

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 09 September 2023 and was last updated on 09 September 2023.

INTRODUCTION

Review question / Objective 1) Which single herbs or multicomponent herbal medicines contain iodine and were the levels of iodine contents in herbs identified?
2) What herbs and herbal ingredients were reported to have regulative effects on sodium-iodine symporter (NIS) on thyroid follicular cell or on iodine/radioactive iodine (RAI) uptake of thyroid in patients?

Background Patients with recurred or metastatic thyroid cancer receive radioactive iodine (RAI) therapy after total thyroidectomy. Successive efficacy of RAI therapy depends on the levels of thyroid-stimulating hormone (TSH), iodine avidity of thyroid carcinoma, and the expression of sodium–iodine symporter (NIS) on thyrocyte. Prior to RAI therapy, thyroid cancer patients stop thyroid replacement treatment and have a low iodine diet (LID) for 7-14 days to cause low iodine status and sequentially to elevate adequate TSH levels.

As the levels of thyroid hormone decreased during LID period, patients suffer from various symptoms of hypothyroidism. Also, RAI treatment induces a number of adverse events such as salivary gland dysfunction.
Single herb and herbal medicines have been used to manage hypothyroidism symptoms. A survey study found that patients with thyroid cancer used herbal supplements for thyroid cancer and for its symptoms. However, before and after RAI therapy, the use of medicinal herbs to improve hypothyroidism symptoms and RAI-induced adverse events is more complicated because the regulatory impact on NIS and iodine contents of herbs should be considered.

Rationale Lack of knowledge on herbs cautiously used or contraindicated in preparing period of RAI therapy is a barrier to administer herbal medicine to enhance quality of life in LID period and to manage various symptoms after RAI therapy. A guideline to find herbal candidates pool for co-administration with RAI treatment by excluding

herbs which may arouse safety concerns on RAI treatments is required.

METHODS

Strategy of data synthesis 1) For a scoping review, Embase, MEDLINE, Web of Science Core Collection, and Google Scholar will be searched. Furthermore, we will hand-search relevant references to find additional eligible studies.
The following search terms will be combined to retrieve papers from databases: 'plants, medicinal', 'herb', 'iodine compounds', 'iodide', and 'plants, medicinal', 'herb', 'thyroid gland', 'thyroid neoplasms', 'iodine-131', 'radioactive iodine therapy', 'sodium-iodide symporter', 'SLC5A5', and 'TDH1'.
2) For a data-mining, TCMBank, HIT 2.0, TM-MC 2.0, SymMap 2.0, HERB, PubChem, STITCH database, SwissADME will be searched.

Eligibility criteria Papers satisfy the following inclusion criteria will be included in this scoping review: (1) experimental study reporting the iodine contents in single herbs or multicomponent herbal medicine without restrictions for iodine determination methods; (2) in vitro, in vivo, and human-based clinical research reporting the effects of herbal ingredients or herbs on NIS in thyroid follicular cell/follicular thyroid carcinoma cell or on iodine/RAI uptake of thyroid in patients. Studies should be written in English and published in peer-reviewed journals up to September 2023.

Source of evidence screening and selection Duplicated papers retrieved from 4 databases and hand-search will be excluded. Two independent reviewers (Bae, K. and Seong, E.) will screen titles and abstracts of yielded papers. After full-text evaluation, the papers meet the eligibility criteria will be included in the scoping review. Discrepancy will be resolved through discussion with a third reviewer (Hong, S.).

Data management Two reviewers (Bae, K. and Oh, JM.) will extract data independently from included studies. Following data will be extracted: citation details, study design, participants or experimental subjects, interventions, outcomes of interest, assessing method, and results. Any disagreement will be resolved by discussion with the third reviewer (Kim, S.).

Reporting results / Analysis of the evidence The confidence of results on individual herb will be categorized into high or low, depending on whether the results are based on empirical evidence or prediction.

Presentation of the results The herbal information from a scoping review and data-mining will be combined and tabulated descriptively. If applicable, we will construct and present the herbal ingredient-target network focusing on NIS. Computational analyses will be performed by using Python and Cytoscape.

Language restriction Papers published in English will be included in this review.

Country(ies) involved Republic of Korea.

Keywords Medicinal plants; Herbal medicine; Thyroid neoplasms; Iodine-131; Radioactive iodine therapy; Sodium-iodide symporter; Iodine compounds.

Dissemination plans The review will be conducted complying with this protocol. The results of the review will be presented in the academic conference and be published in a peer-reviewed journal.

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