Probable interaction between levothyroxine sodium and thyme
(Thymus vulgaris), about a case report

[Interacción probable entre levotiroxina sódica y tomillo (Thymus vulgaris), sobre un reporte de caso]

Nassima Elyebdri1,2*, Sihem Baba Ahmed1, Nessrine Abourejal1, Lotfi Loudjedi1, Assia Bououden3, Nour El Houda Khelili4

1Department of Pharmacy, Faculty of Medicine, Abou Bekr Belkaid University, Tlemcen, Algeria.
2Laboratory of Organic Chemistry Natural Substances and Analysis (C.O.S.N.A.), Abu Bekr Belkaid University, Tlemcen, Algeria.
3Department of Medicine, Faculty of Medicine, Abou Bekr Belkaid University, Tlemcen, Algeria.
4Department of Medicine, Faculty of Medicine, Abou Bekr Belkaid University, Tlemcen, Algeria.

*E-mail: nassimaelyebdri@univ-tlemcen.dz, nassimaelyebdri@gmail.com

Abstract
Thyme (Thymus vulgaris) is often used thanks to its anti-infectious properties to treat seasonal influenza. Some patients use it in conjunction with their conventional treatment, which can expose them to adverse effects or interactions. A case of probable pharmacokinetic interaction of levothyroxine and thyme is described. This is a case of 52-year-old woman admitted to the toxicology department in January 2024 after a phytovigilance questionnaire. The patient had a treatment for hypothyroidism consisting in levothyroxine sodium with a daily dose of 150 µg, but she showed palpitations following the taking of a T. vulgaris tea to treat her seasonal flu. She reported that the symptoms disappeared by reducing the doses of T. vulgaris. The score of the probability scale of the interaction was 6, so a probable interaction may occur in patients with thyroid disorders and taking levothyroxine sodium concomitantly with T. vulgaris.

Keywords: herbal-drug interaction; hypothyroidism; levothyroxine; thyme.

Resumen
El tomillo (Thymus vulgaris) se utiliza a menudo gracias a sus propiedades antinfecciosas para tratar la gripe estacional. Algunos pacientes lo utilizan junto con su tratamiento convencional, lo que puede exponerles a efectos adversos o interacciones. Se describe un caso de probable interacción farmacocinética de levotiroxina y tomillo. Se trata de una mujer de 52 años ingresada en el servicio de toxicología en enero de 2024 tras un cuestionario de fitovigilancia. La paciente tenía un tratamiento para el hipotiroidismo consistente en levotiroxina sódica con una dosis diaria de 150 µg, pero presentó palpitaciones tras tomar una infusión de T. vulgaris para tratar su gripe estacional. Informó de que los síntomas desaparecieron al reducir las dosis de T. vulgaris. La puntuación de la escala de probabilidad de la interacción fue de 6, por lo que puede producirse una interacción probable en pacientes con trastornos tiroideos y que toman levotiroxina sódica concomitantemente con T. vulgaris.

Palabras Clave: hipotiroidismo; interacción hierba-fármaco; levotiroxina; tomillo.

ARTICLE INFO
Received: March 7, 2024.
Accepted: June 5, 2024.
Available Online: June 30, 2024.

AUTHOR INFO
ORCID:
0000-0001-5630-5370 (NE)
0000-0002-3376-5338 (LL)
0000-0002-0304-7811 (SBA)
0009-0002-5677-3806 (AB)
0000-0003-4100-2863 (NA)
0000-0003-1598-1692 (NEHK)

INTRODUCTION
Traditional medicine and the use of medicinal plants are part of the culture of the Mediterranean population (Hammiche and Maiza, 2006). Thyme (Thymus vulgaris) is often used thanks to its anti-infectious properties to treat seasonal influenza (Hammiche and Maiza, 2006). Convinced of its safety, some patients use it in conjunction with their conventional treatment, which can expose them to adverse effects or interactions.

CASE HISTORY
A case of probable pharmacokinetic interaction of levothyroxine and thyme is described. This is a 52-year-old woman admitted to the toxicology department in January 2024 after a phytovigilance questionnaire. The patient was admitted by endocrinology for hypothyroidism. She took levotiroxine sodium with a daily dose of 150 µg. The reason for our intervention was palpitations following the taking of a T. vulgaris tea to treat her seasonal flu. She brewed it (a handful per cup) once a day for three days. The patient reported that her flu was cured but each time she took this herbal tea, she suffered palpitation, and occurred two days after taking it. She also stated that she was taking thyme tea during her conventional treatment. Also, she reported that the symptoms disappeared by reducing the doses of T. vulgaris (see Table 1).

DISCUSSION
Heart rhythm disorders are one of the side effects related to the overdose of levotiroxine (Roguet, 2016). It is mentioned that they occur two to three days after the overdose, which coincides with the reported effect.
Table 1. Chronology of the occurrence of the adverse reaction.

<table>
<thead>
<tr>
<th>Chronology of effects</th>
<th>Medication and analyses</th>
<th>Observations</th>
</tr>
</thead>
</table>
| Palpitation, tachycardia confirmed by electrocardiogram, hypertension, especially systolic (90-95 mm Hg) | - Antiarrhytmic (hawthorn extract, 1 tablet per day) and anti-hypertensive (Lopressor 100 mg, half tablet per day).  
  - Decrease doses of levothyroxine sodium by 175 µg every other day and then 150 µg per day (dosage adjustment). | Patient stabilization, no adverse effects.                                     |
| Taking T. vulgaris during a flu                                | Levothyroxine sodium 150 µg daily             | Tachycardia was confirmed by an electrocardiogram two days after taking T. vulgaris. |
| Stopping the intake of T. vulgaris                            | Levothyroxine sodium 150 µg daily             | Disappearance of effects after 4 days.                                         |
| Reintroduction of T. vulgaris                                 | Levothyroxine sodium 150 µg daily             | Reappearance of tachycardia two days after taking.                             |
| Stopping the intake of T. vulgaris                            | Levothyroxine sodium 150 µg daily             | Disappearance of effects 3-4 days after discontinuation.                       |
| Taking of Thyme during flu, brewed by reducing the usual doses | Levothyroxine Sodium 150 µg daily             | No side effects                                                               |

Pharmacokinetically, glycoprotein P (P-gp) is involved in levothyroxine sodium metabolism (Ghorbanzadeh et al., 2022). According to one study, carvacrol, a component of T. vulgaris, has been shown to inhibit P-gp (Abas, 2002; Ghorbanzadeh et al., 2022). Inhibition of this protein leads to increased plasma levels of the drug (Quest, 2008), which leads us to the interaction hypothesis. In the literature, one study reported palpitations in patients with thyroid disorders and using T. vulgaris (Quest, 2008), but no study reported interaction with sufficiently demonstrated clinical data.

The score of the probability scale of the interaction was 6, so a probable interaction may occur in patients with thyroid disorders and taking levothyroxine sodium concomitantly with T. vulgaris.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ACKNOWLEDGMENTS

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

Elyebdri et al.

Probable interaction between levothyroxine and *Thymus vulgaris*

**AUTHOR CONTRIBUTION:**

<table>
<thead>
<tr>
<th>Contribution</th>
<th>Elyebdri N</th>
<th>Baba Ahmed S</th>
<th>Abourejal N</th>
<th>Loudjedi L</th>
<th>Bououden A</th>
<th>Khelil NEH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concepts or ideas</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental studies</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data acquisition</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Data analysis</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manuscript preparation</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manuscript editing</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manuscript review</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>


**Publisher's Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

**Open Access:** This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits use, duplication, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.