Botanical Medicine for Thyroid Regulation

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Abstract

Various herbal medicines show enormous promise when it comes to hyperthyroid conditions. Of particular note are bugleweed (Lycopus virginicus), gypsywort (Lycopus europaeus), water horehound (Lycopus lucidus or Lycopus americanus), gromwell (Lithospermum ruderale), and European gromwell (Lithospermum officinale).

Lemonbalm (Melissa officinalis) also shows promise in the treatment of hyperthyroidism, and rosemary (Rosmarinus officinalis) and sage (Salvia officinalis) should be investigated, given their similarities to lemon balm. Bladderwrack (Fucus vesiculosus), a brown algae, occupies a unique place in therapy in that the herb is used for treating both hyperthyroidism and hypothyroidism, although the seaweed’s effects are poorly understood.

Other herbs—often used for treating hypothyroidism, such as gotu kola (Centella asiatica), coleus or forskohlii (Plectranthus barbatus, also known as Coleus forskohlii), guggul (Commiphora mukul), and ashwagandha (Withania somnifera)—have varying degrees of preclinical research support but are less clearly effective in practice.

Introduction

Thyroid dysfunctions of various types plague the health of Western society. Most authoritative sources agree that the annual incidence of hyperthyroidism in the West is 1 in 1000 women or 10,000 men; the incidence of hypothyroidism is at least ten times as great. The problem is accelerating, in part, because of environmental pollution that damages the thyroid. Some of this damage has come from incidents of intentional pollution, such as the infamous 1949 Green Run experiment, which deliberately exposed a wide swath of the Pacific Northwest of the United States to radiation released from the Hanford Nuclear Reservation.1

Although little research has been done, there are many herbal medicines that provide treatment options to patients with thyroid disorders. It is our experience that herbal medicines for hyperthyroid patients are generally effective for reducing symptoms regardless of etiology, though additional treatment to address the cause(s) should always be undertaken.

Greatest efficacy has been observed in patients with Graves’ address disease. No clear evidence of negative interactions with thyroid medications has been observed. Efficacy in patients with hypothyroidism is much more variable, and other treatments—including, but not limited to, thyroid hormone replacement—should generally accompany herbal therapy. Herbal treatment of patients with serious thyroid conditions should only be undertaken in consultation with an experienced practitioner of botanical medicine.

Bugleweed: A Thyrosuppressive

One of the more surprising things about herbs for thyroid disorders is that the herbs that suppress thyroid function are the ones that are most effective. In most other areas of medicine, herbal tonics that support or augment normal function stand out as most effective. This is simply not the case with the thyroid.

Bugleweed is native to North America and is found east of the Mississippi River. The herb is a member of the Lamiaceae (mint) family. Many other members of this family are also thyrosuppressive, suggesting that there is a common set of constituents present in the Lamiaceae that have the same activity. The most likely candidates, based on work with bugleweed and other herbs, are various hydroxyacinnamic-acid–derived simple plant acids, such as lithospermic, rosmarinic, caffeic, and chlorogenic acids.

At least three other Lycopus species are similarly used around the world—gypsywort from Europe, an Asian variety of water horehound from Asia, and a North American variety of water horehound. At least one in vitro study has found extracts of bugleweed and gypsywort to be equally effective.2

Historically, the effects of bugleweed have been related to the heart and lungs. For instance, the noted Eclectic physician Harvey Wickes Felter, M.D., wrote in 1922 that bugleweed was primarily used for “vascular excitement, with rapid, tumultuous action of the heart, but lacking power.”3 He also described this herb as a remedy for bleeding in various organs, coughs, and diabetes—all situations when a rapid heartbeat was present.

Bugleweed, however, also was used by the Eclectics for treating insomnia in acute and chronic diseases, and to treat exophthalmic goiter.4 One of the main symptom pictures for the herb’s use was wakefulness and morbid vigilance with an inordinately active circulation and rapid pulse. This coincides with the fact that patients with hyperthyroidism often experience insomnia, palpitations, and tachycardia.
Bugleweed and gypsywort have been studied for their effects on the thyroid since at least the 1950s in Germany.\textsuperscript{5} Bugleweed and its extracts (or those of its cousins) have many beneficial effects that might explain its efficacy for reducing hyperthyroid symptoms. These effects include the ability to inhibit binding of the stimulating antibodies of Graves’ disease to the thyroid cells; blocking thyroid-stimulating hormone (TSH) production; decreasing peripheral T4 deiodination; and possibly inhibiting iodine metabolism.\textsuperscript{6–8} However, there appear to be no human clinical trials documenting the efficacy of bugleweed for hyperthyroidism or any other indication.

Bugleweed and its cousins do have other documented effects. Extracts have been shown to decrease prolactin levels and to inhibit secretion of luteinizing hormone (LH) and follicle-stimulating hormone (FSH).\textsuperscript{9} One case study found that 5–13 g of a freeze-dried bugleweed extract taken daily for 1 month decreased LH secretion in 1 woman.\textsuperscript{10} It has been demonstrated that gypsywort enhances the efficacy of various antibiotic drugs against drug-resistant microbes in vitro.\textsuperscript{11}

More recently, water horehound has been studied more extensively in Asia and has shown some very interesting properties, such as producing antioxidant activities; decreasing blood viscosity; and having antiallergic effects.\textsuperscript{12–14} Given all this potential, clearly, bugleweed and its relatives deserve more research, and should be investigated in clinical trials.

Traditionally, aqueous extracts have been the most-prepared form of bugleweed and its cousins, although the Eclectics often used alcoholic extracts. At least one study found that tinctures prepared using 70 percent ethanol had much higher levels of the critical hydroxycinnamic acid derivatives than aqueous extracts.\textsuperscript{15} A typical dose of tincture is 2–4 mL three times per day for an average-size adult. More may be required initially to treat the more severe hyperthyroid symptoms.

To prepare a tea, a patient should infuse 2–3 teaspoons (5–10 g) of air-dried herb in a cup (250 mL) of hot water, covered, for 15–20 minutes. The patient should drink 1 cup of this tea three times per day.

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**Dr. Silena Heron’s ThyroNix Formula**

The late Silena Heron, N.D.—the mentor of Dr. Yarnell—created a formula known as Dr. Heron’s ThyroNix. Together with Dr. Yarnell, Dr. Heron used her ThyroNix successfully for many years in practice in several patients with hyperthyroidism (primarily Graves’ disease).

These patients often took the formula for months or years continuously. We also recommended this formula to several other clinicians who subsequently reported it as efficacious; no adverse effects were encountered despite long-term use.

This formula, described in the table below, often was adjusted to an individual patient to fit the patient’s exact situation. It is not certain exactly why no one ever appeared to have developed liver toxicity or gonadotropin suppression from this formula; all we can state is that we have never encountered any such problems.

<table>
<thead>
<tr>
<th>Common name</th>
<th>Latin binomial</th>
<th>Extract used</th>
<th>% in Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gromwell</td>
<td>Lithospermum nudareale</td>
<td>Tincture of fresh root</td>
<td>10–15</td>
</tr>
<tr>
<td>Bladderwrack</td>
<td>Fucus vesiculosus</td>
<td>Tincture of dried thallus</td>
<td>10–20</td>
</tr>
<tr>
<td>Motherwort</td>
<td>Leonurus cardiaca</td>
<td>Tincture of fresh herb</td>
<td>10–20</td>
</tr>
<tr>
<td>Bugleweed</td>
<td>Lycopodium virginicu</td>
<td>Tincture of fresh herb</td>
<td>10–20</td>
</tr>
<tr>
<td>Lemonbalm</td>
<td>Melissa officinalis</td>
<td>Tincture of fresh herb</td>
<td>10–20</td>
</tr>
<tr>
<td>Watercress</td>
<td>Rorippa nast-aquat</td>
<td>Glycerite of fresh herb</td>
<td>5–10</td>
</tr>
<tr>
<td>Mullein leaf</td>
<td>Verbascum thapsus</td>
<td>Glycerite of fresh leaf</td>
<td>5–10</td>
</tr>
<tr>
<td>Horseradish</td>
<td>Armoracia rusticana</td>
<td>Tincture of fresh root</td>
<td>5–10</td>
</tr>
</tbody>
</table>

Dose: 1 tsp (5 mL) three times per day for an average-size adult.
times per day. This dose may be able to be decreased over
time.

Few if any adverse effects have been observed with bugleweed
in practice, although the herb should not theoretically be given to
people with hypothyroidism or during pregnancy.

Other Minty Thyrosuppressives

Lemonbalm is a gentle herb that is also from the Lamiaceae
family. This herb has long been a favorite for treating infant
colic and even viral infections in newborns, attesting to lemon-
balm’s gentleness. Old European herbalists report its memory-
improving properties; the German Commission E has
approved the herb’s use for nervous sleeping disorders; and
the European Scientific Cooperative on Phytotherapy lists
lemonbalm’s use for restlessness, irritability, digestive disor-
ders, and cold sores.16 Although lemonbalm has no history of
use for hyperthyroid conditions, clinicians are increasingly
including the herb as a component of herbal formulas for
hyperthyroidism.

Although lemonbalm is widely used as a nervine and an
antiviral, there are no reports of anyone developing hypo-
thyroidism while taking the herb for other conditions, nor are there
any suggestions that persons who have hypothyroidism should
not use lemonbalm.

This clinical experience suggests (but does not prove) that
lemonbalm, like Lycopus spp., will only inhibit an overactive
thyroid and not one that is functioning normally.

Current use of lemonbalm in hyperthyroidism is based in large
measure on pharmacologic studies. In vitro, lemonbalm has
inhibited binding of TSH to thyroid follicles, blocked peripheral
deiodination of T4, and blocked the stimulating autoantibodies of
Graves’ disease.6,17 In addition, lemonbalm has historically been
considered to be useful for calming the heart. There are thus
many similarities between lemonbalm and bugleweed.

However, lemonbalm contains higher levels of low–molecular
weight terpenoids, such as citral and citronellal, than does bugle-
weed, and this, at least in part, contributes to effects not generally
seen in bugleweed. Lemonbalm is an antiviral, most notably
against herpes simplex, and is also a smooth-muscle spasmytic
and nerve.18–20 A recent double-blind clinical trial docu-
menting the herb’s benefits in patients with Alzheimer’s disease
showed more properties specific to lemonbalm.21

We have not used lemonbalm alone as a treatment for hyper-
thyroidism but, in our clinical practice, lemonbalm has seemed to
enhance the action of bugleweed. Lemonbalm’s possible syner-
gastic effects in this context deserve research.

A usual dose of lemonbalm tincture (60 percent plus ethanol) is
3–5 mL three times per day for an average-size adult. There are
no known contraindications.

Lemonbalm resembles several other Lamiaceae family plants
in its nonthyroid actions, particularly rosemary and sage. Both of
these herbs are antiviral, antioxidative, nerve, and spasmytic,
and contain both hydroxycinnamic-acid derivatives and
low–molecular-weight terpenoids. While neither rosemary nor
sage is considered thyrosuppressive, it is entirely possible they
both may have such actions and should be investigated for this.
The same holds true of other members of this family with similar
constituent profiles.

Gromwell: A Different Story

Two herbs with actions that are very similar to—although
somewhat stronger than—bugleweed’s are gromwell from North
America and from Europe. These herbs are in the Boraginaceae
family. They also contain hydroxycinnamic-acid derivatives,
such as lithospermic acid, which are similar to those seen in
Lamiaceae thyrosuppressives. However, these herbs also contain
naphthoquinone compounds and unsaturated pyrrolizidine alkali-
oids that distinguish them from bugleweed or lemonbalm.

Gromwell has basically been shown to act similarly to bugle-
weed. For instance, gromwell blocks binding of TSH to thyroid
follicles, inhibits iodide transport into thyroid follicles, decreases
peripheral deiodination of T4, and blocks thyroid hormone
secretion.2,22 It is also clear that gromwell blocks secretion of LH
and FSH, with minimal-to-no effects on direct binding of estro-
gen, progesterone, or testosterone to their receptors.23–25 In gen-
eral, gromwell seems to be a more potent producer of these
actions than bugleweed or lemonbalm. However, gromwell can
therefore also be more dangerous.

The unsaturated pyrrolizidine alkaloids (UPAs) in gromwell
are the constituents of concern. These compounds have caused
severe liver and kidney damage when ingested by animals from
other plants. As yet, however, there are no reports of them caus-
ing any harm to humans. The apparent toxicity of these alkaloids
is difficult to reconcile with the fact that the herb has been used
for millennia and usually for long periods of time without any
report of UPA toxicity.

It is possible that the relatively low levels of alkaloids in
these plants, and/or the fact that they were traditionally pre-
pared as teas, which would not be as effective at extracting
The Dual Nature of Bladderwrack

*Fucus vesiculosus* (bladderwrack) and closely related brown algae in the family Fucaceae—particularly blackwrack (*F. serratus*)—are not plants at all, but photosynthetic protists. Unlike plants, they do not have specialized protective structures around their gametes and do not undergo embryonic development. Unlike fungi, they do not have chitin in their cell walls. Thus, seaweeds such as bladderwrack are in their own separate kingdom, Protista. The part of bladderwrack that is used medicinally is known as the thallus, the undifferentiated frond often seen lying on beaches.

Bladderwrack has historically been used to regulate and protect the thyroid, regardless of whether it is hyperactive, normal, or underactive. Despite this, there is actually very little information available about the effects of this seaweed on the thyroid.

Bladderwrack and all seaweeds contain substantial but variable quantities of iodine. One study on commercially available seaweeds in the United States found a range of 16 to more than 8000 mcg/g of iodine. Dried bladderwrack generally contains approximately 0.05 percent iodine, or 50 mcg/g. The effects of iodine on the thyroid are very complex, and may help explain the ability of bladderwrack to help some people with hypothyroidism and others with hyperthyroidism (see Fig. 1).

The German Commission E states that daily ingestion of more than 150 mcg of iodine from bladderwrack could induce or exacerbate hyperthyroidism. Total daily iodine intake should generally not exceed 1000 mcg, although there is wide individual variability in sensitivity. In one study, healthy subjects given 2 or 4 capsules of kelp (probably Laminaria) per day had significant elevations in TSH levels and decreased T3 levels compared to baseline, while patients taking alfalfa capsules had no such changes.

Although Hashimoto’s thyroiditis is common in Japan where dietary seaweed and thus iodine intake is very high, researchers disagree about whether differences in iodine levels between affected and unaffected patients explain the incidence of this condition.

The bottom line is that the true effects of bladderwrack on patients with thyroid conditions are unknown, but low levels of supplementation are probably safe in most patients. Patients who are clearly iodine-deficient can obtain reasonable amounts of iodine by eating 1-2 g of dried bladderwrack per day. Anyone who is clearly consuming more than 1000 mcg of iodine per day already probably will not benefit and may be harmed from bladderwrack supplementation.

Other Herbs for Treating Hypothyroidism

Despite the boundless enthusiasm on the Internet about herbs for hypothyroidism, there is little evidence documenting the efficacy of any herbs in patients with the condition. The sole exceptions are a number of open clinical trials conducted on a variety of herbal formulas in China for what they call Kidney yang deficiency (and what we would call hypothyroidism) showing benefit. But with the exception of these studies, clinical information on herbal treatments for hypothyroidism is entirely lacking.
Yet there are a number of herbs that hold promise. One of these is the adaptogen ashwagandha. Ashwagandha administered daily to female mice increased serum thyroxine (T4) concentrations in one study. 38 Fish exposed to organochlorine pesticides had elevated TSH levels that were normalized by treatment with the aqueous root extract of ashwagandha and shankpushpi (Cortotulbus pluricaulis). 39

There is a Dutch case report of a healthy woman who developed thyrotoxicosis while taking ashwagandha capsules for fatigue. Her symptoms resolved after discontinuing the capsules. 40 As the paper was in Dutch we were unable to review the entire paper to determine whether the capsules contained other herbs and whether its conclusion in the abstract that ashwagandha was responsible for elevating her thyroid levels was sound. This case does nonetheless support the animal studies suggesting that ashwagandha can stimulate thyroid function.

Gotu kola leaf is commonly recommended in hypothyroidism, and the noted Southwestern herbalist Michael Moore has written that this herb stimulates T4 synthesis (Michael Moore, personal communication). We, however, were unable to locate any data documenting gotu kola’s effect on the thyroid and have not found it to have remarkable clinical effects in our practice.

Other herbs that have a potential place in the treatment of hypothyroidism are bauhinia (Bauhinia purpurea) bark, forskholi or coles leaf, and guggul gum resin. Clinical evidence supporting their efficacy is lacking, however, and they are not widely used by Western herbalists.

In mice, bauhinia administered orally increased both T3 and T4 levels in one study and, combined with ashwagandha and guggul, again, increased both levels. 41 Guggul gum resin at 200 mg/kg daily counteracted drug-induced hypothyroidism in female mice in one study. 42 However, one case series in humans found that 750 mg guggulsterone daily from guggul had no effect on thyroid function in obese patients. 43

Finally, coles leaf is sometimes recommended for hypothyroidism based on the herb’s mechanism of action—coles stimulates adenylate cyclase. For that reason, there is a theoretical argument that it is capable of mimicking the effect of TSH, which also activates adenylate cyclase when binding to the TSH receptor. In vitro, the compound forskolin (derived from coles leaf) increased T4 synthesis by thyroid follicles. 44 No clinical data could be located.

Further research on the ability of these herbs to stimulate thyroid function is needed, as hypothyroidism is a common condition that is inadequately treated.

Conclusions

Given the promising preclinical research and supportive empirical results from clinical practice, bugleweed, lemon balm, gromwell, and possibly other Lamiaceae family plants should be studied in clinical trials on patients with hyperthyroidism as relatively safe and inexpensive alternatives to thyrosuppressive drugs. Much less information is available supporting the use of herbs for patients with hypothyroidism, although there is still an urgent need for research in this area, given the large degree to which people are likely taking various herbs in an attempt to remedy this common condition.

References

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