CASE REPORT

Anticholinergic Syndrome and Supraventricular Tachycardia Caused by Lavender Tea Toxicity

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Lavender plants have been used for their cosmetic and biologic benefits for many centries. Extracts from *Lavandula* plants have been found to cause antimuscarinic effects by blocking sodium and calcium ion channels in *in vitro* and *in vivo* studies. We present a case of poisoning by ingestion of tea made from *Lavender stoechas* (grass). The patient was admitted to our emergency department with supraventricular tachycardia due to anticholinergic syndrome triggered by drinking lavender tea. On electrocardiography, a narrow QRS complex tachycardia was evident. After carotid sinus massage, the patient immediately returned to sinus rhythm. There are no reported data about the toxicity of *Lavender stoechas* plants with respect to supraventricular tachycardia, anticholinergic syndrome or sympathetic nerve activity. (Keio J Med 61 (2): 66–68, June 2012)

Keywords: emergency, lavender, supraventricular tachycardia, poisoning

Introduction

Lavender plants have been in widespread use in our daily lives since the 18th century because of their cosmetic and biologic effects. Teas and distilled oils prepared from plants of *Lavandula* spp. have been used as antibacterial, antifungal, sedative, expectorant and analgesic agents; smooth muscle relaxants; antiseptic for urinary tract infections; and for soothing burns and insect bites. Despite the wide-ranging use of these teas and oils, their biological effects and side effects are not known in detail.¹

Because alternative medical treatments and use of medicinal plants are increasing worldwide, allergic reactions that can lead to serious poisoning are observed frequently. In this article, we present a poisoning case resulting from the ingestion of tea made from *Lavender stoechas* (Buckwheat grass), which was drunk by a woman for its antitussive and expectorant effects in an attempt to treat her cough. She was admitted to our emergency department with supraventricular tachycardia triggered by anticholinergic syndrome or sympathetic nerve activity, which are frequent side effects of products made from these plants.

Case

A 46-year-old woman was admitted to our emergency department with palpitations and shortness of breath that had been present for 6 h. She reported that she had drunk buckwheat herb (*Lavender stoechas*) tea (Fig. 1) 7 h before admission for the treatment of her cough, which had persisted for 1 week. Her symptoms were palpitations, shortness of breath, headache, dizziness, nausea, and epigastric pain and fever; these had started approximately 1 h after herbal tea ingestion. On admission to the emergency room, the patient's arterial blood pressure was

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Fig. 1 Buckwheat herb (*Lavender stoechas*). Our patient drank tea made from these plants.

150/100 mmHg, pulse rate 164/min, temperature 38.7°C and respiratory rate 22/min. Her Glasgow Coma Scale (GCS) score was 15 and other systemic findings were normal. The patient's complete blood count, biochemistry and blood gas levels were found to be in the normal ranges. A narrow QRS complex tachycardia was found on electrocardiography (Fig. 2). The patient was monitored, 4 L/min oxygen was started via nasal cannula and intravenous access was established. Because her fever did not respond to cold compress application, intravenous paracetamol was given, and this led to normalization of body temperature at 36.7°C. Since her tachycardia persisted despite normalization of body temperature, carotid sinus massage was performed; this resulted in abrupt termination of the supraventricular tachycardia and maintenance of sinus rhythm. The control electrocardiography taken after the termination of supraventricular tachycardia revealed normal sinus rhythm, and no other pathological signs were observed (Fig. 3). Control vital signs were as follows: arterial blood pressure, 130/70 mmHg; pulse rate, 84/min; temperature, 36.7°C; respiratory rate, 16/min. The patient was hospitalized in the observation unit, and after 24 h of observation, no additional problems occurred and the patient was discharged with advice to use these kinds of herbal products cautiously.

Discussion

Lavender tea and oil obtained from lavender plants have been in general use for many centuries. *Lavandula* spp. are widely used because of their biological and cosmetic properties. The most commonly used *Lavandula* spp. are *L. angustifolia*, *L. latifolia*, *L. stoechas* and *L. x intermedia*.¹ The tea and oil of these plants are often used as smooth muscle relaxants, antibacterial and antifungal agents, and expectorants; they are also used to treat insect bites owing to their relaxant effects. Although *Lavandula* spp. are widely used, scientific studies on the effects of these plants and their ingredients have only been carried out in recent decades. The chemical constituents of *Lavandula* plants have been identified by analysis of oils obtained from flowers. Essential oils of *Lavandula* spp. have complex compositions made up of many different aromatic compounds. These substances have been examined and determined by analytic techniques such as gas chromatography, mass spectrometry and infrared spectroscopy. The main components of these oils are linalool, linalyl acetate, 1.8 cineole, β -ocimene, terpinene-4-ol and camphor.²

The systemic effects of the chemical constituents of *Lavandula* spp. may begin after contact of the skin with oils, inhalation due to their volatile properties or the drinking of tea. Plasma levels of linalool and linalyl acetate increase about 19 min after the oils from these plants contact the skin.³ Linalool and linalyl acetate have narcotic and sedating effects on the central nervous system. It is believed that these substances affect especially the amygdala and hippocampus regions of the limbic system by increasing the effects of gamma hydroxyl butyric acid and resulting in benzodiazepine-like sedative effects.⁴

Antispasmodic effects of *Lavandula* spp. have occurred because of the resulting increase in intracellular cAMP.⁵ *Lavandula* spp. are also believed to have antibacterial and antifungal effects. In *in vitro* studies, *L. Angustifolia* oil was shown to be reactive against methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus faecalis* (VRE) at concentrations of less than 1%.⁶

Lavandula spp. contain many camphor-related substances. Those species with high camphor content are preferred as insect repellents, whereas those with low camphor content are preferred by the perfume industry. *L. stoechas* has a high camphor content.^{1,7}

L. stoechas, also known as buckwheat herb, is widely used in the community as an analgesic, expectorant, sedative and urinary antiseptic. The oils obtained from this plant are preferred for topical application as antiseptic solutions and insect repellents. The compounds found in *L. stoechas* include saponins, glycosides, camphor, cineol and borbor.⁸ Camphor levels are higher in *L. stoechas* than in other *Lavandula* spp. Most of the dermal or systemic effects are thought to result from the high levels of camphor. Camphor is a cyclic ketone of the hydroaromatic terpene group with a strong and aromatic scent. Camphor is used as an antibacterial, local analgesic, inotropic agent, brain and nerve stimulant against syncope, expectorant, antitussive, cold drug and moth repellent.⁸

It is used today in the pharmaceutical industry as a topical antitussive and analgesic and is a preferred anesthetic and antipruritic agent. If it is used in improper doses, however, it can cause poisoning. Poisoning related to *Lavandula* spp. may occur with gastrointestinal intake, skin contact or inhalation,⁸ and camphor toxicity begins



Fig. 2 A narrow QRS tachycardia was seen on electrocardiography.

within the first hours after intake. The first signs are oral and epigastric burning, nausea, vomiting and headache. Other adverse effects are tachycardia, elevated liver enzymes, and central nervous system and cardiovascular system toxicity.^{9,10} The toxic effect on the central nervous system can result in mental confusion and convulsion. Severe poisoning can cause status epilepticus, apnea, asystole, circulatory collapse and death.¹⁰ Serious central nervous system toxicity related to accidental camphor exposure, especially in children, has been reported in the literature. Camphor exhibits cardiovascular toxicity and it is known to cause hypertension and tachycardia during the early stage of toxicity and to cause peripheral vascular collapse and shock in serious cases. QT and prolonged QTc in electrocardiograms and acute myocarditis due to camphor toxicity have been reported in one case in the literature.¹⁰ Since our center was not able to measure camphor levels, we could not determine the plasma level in our patient.

We think that the tachycardia, hypertension and signs of high temperature seen in our patient may have resulted from the camphor in L. stoechas plants or may have been consequences of either sympathomimetic or anticholinergic toxicity as well. Ghelerdani et al. showed that plants of *Lavandula* spp. may cause antimuscarinic effects by blocking sodium and calcium ion channels in in vitro and *in vivo* studies.⁹ The fever, tachycardia and signs of hypertension occurring in our patient may have been related to antimuscarinic effects caused by inhibition of central and peripheral muscarinic cholinergic nerve conduction. There are no data in the literature demonstrating sustained arrhythmias (e.g., supraventricular tachycardia and ventricular tachycardia) and anticholinergic symptoms triggered by L. stoechas. The patient did not drink the herbal tea again after her recovery, so we could not observe a direct relationship between herbal tea ingestion and arrhythmia generation. This fact diminishes the proof of our hypothesis and is the main limitation of this article.



Fig. 3 Normal sinus rhythm was seen after termination of supraventricular tachycardia.

In conclusion, we reported on a patient who experienced hyperthermia, hypertension and supraventricular tachycardia after drinking a very popular kind of herbal tea that contains *L. stoechas* (Buckwheat herb). The extracts of *L. stoechas* may show adverse antimuscarinic effects, and therefore appropriate advice should be given to patients who have arrhythmic conditions.

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