Case report

Earl Grey tea intoxication

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A 44-year-old man presented in May, 2001, with muscle cramps. He had no medical history of note, but volunteered the fact that he had been drinking up to 4 L of black tea per day over the past 25 years. His preferred brand was GoldTeefix (Tekanne, Salzburg, Austria). Since this type of tea had given him occasional gastric pain, he changed to Earl Grey (Twinings & Company, London, UK), which he thought would be less harmful to his stomach. 1 week after the change, he noticed repeated muscle cramps for some seconds in his right foot. The longer he drank Earl Grey tea, the more intense the muscle cramps became. After 3 weeks, they also occurred in the left foot. After 5 weeks, muscle cramps had spread towards the hands and the right calf. Occasionally, he observed fasciculations of the right adductor pollicis and gastrocnemius. Additionally, he noted distal paraesthesias in all limbs, and a feeling of pressure in his eyes, associated with blurred vision, particularly in darkness. On neurologic examination he had reduced visual acuity and fasciculations in the right tibialis anterior and adductor pollicis. Motor and sensory nerve conduction studies of the right median, peroneal and sural nerves were normal. Needle electromyography of the right tibialis anterior showed fasciculations at 6 of 20 sites, but motor unit architecture was preserved. Ophthalmological tonometry and fundoscopy, and cerebral magnetic resonance imaging were normal. Tests of thyroid, hepatic, adrenal, and kidney functions showed no abnormalities. Serum and urine potassium, chloride, calcium, magnesium, and phosphate were all within the normal range. He did not have polydipsia, and was quite capable of reducing his fluid intake to 1–2 L per day. I excluded motor neurone disease, polyneuropathy, myopathy, neuromyotonia, stiff-man syndrome, and Machado-Joseph disease by appropriate tests. The patient assumed that there was a relation between his symptoms and his tea consumption, and stopped drinking Earl Grey after 5 months, reverting to pure black tea again. Within 1 week, his symptoms had completely disappeared. Symptoms also remained absent if he completely withdrew from tea, which he did in the nature of experiment, for about a week. He found that his symptoms did not recur as long as he consumed no more than 1 L of Earl Grey daily. When last seen in November, 2001, neurological examination, nerve conduction studies, and electromyography were normal. He was still drinking 2 L of plain black tea daily (his entire fluid intake), and had no complaints.

Earl Grey tea is composed of black tea and the essence of bergamot oil, an extract from the rind of bergamot orange (*Citrus aurantium* ssp bergamia), which has a pleasant, refreshing scent.[1] Bergamot oil contains bergapten (5-methoxypsoralen), bergamottin (5-geranyloxypsoralen), and citropten (5,7-dimethoxycoumarin), which can be found in grapefruit juice, celery, parsnips, and Seville orange juice. Bergamot oil is a well-known UVA-induced photosensitiser with a strong phototoxic effect, and is used therapeutically in psoriasis, vitiligo, mycosis fungoides, and cutaneous lymphoma. Because of this side-effect, bergamot oil has been widely banned as an ingredient in cosmetics and tanning products.[1] Bergamot oil also has a hepatotoxic effect and may cause contact-allergy. The adverse effects of bergamot oil in this patient are explained by the effect of bergapten as a largely selective axolemmal potassium channel blocker,[2] reducing potassium permeability at the nodes of Ranvier in a time-dependent manner.[3] This may lead to hyperexcitability of the axonal membrane and phasic alterations of potassium currents, causing fasciculations and muscle cramps.[3,4] Impaired potassium-channel function plays a pathogenic role in other disorders with fasciculations, myokymia, and cramps such as Isaacs' syndrome, episodic ataxia/myokymia syndrome, and amyotrophic lateral sclerosis.[4,5] Hyperexcitability may be enhanced by prolonged opening of voltage-gated sodium-channels due to bergapten.[3,4]

A soothing cup of tea?

Tea is regarded a delicious, aromatic stimulant world-wide. However, even tea may lead to health problems if flavoured and consumed in extraordinarily high quantities. Bergamot essence in Earl Grey tea, when consumed in excess, may induce muscle cramps, fasciculations, paraesthesias and blurred vision.

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