

The old lady who liked liquorice: hypertension due to chronic intoxication in a memory-impaired patient

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ABSTRACT

The authors report an 85-year-old patient admitted because of cognitive impairment. During examination hypertension and hypokalaemia were found. After some time it was discovered that the patient was eating too much liquorice. The case demonstrates that liquorice intoxication should be considered as a cause of hypertension in old age. Furthermore the case demonstrates that missing an intoxication is a pitfall for medical history taking of patients with cognitive impairment.

INTRODUCTION

Ingestion of liquorice is a well-known reason for a syndrome mimicking mineralocorticoid excess, of which the pathophysiology is completely clarified.¹ The characteristics of this syndrome are hypertension, hypokalaemia, alkalosis, low renin activity and hypoaldosteronism.² Most of the recently published literature consists of case reports of patients suffering from paralysis because of liquorice-induced hypokalaemia. Most of these case histories report on younger or middle-aged patients. As far as we know, self-induced licorice intoxication has not been reported before in the very elderly (over 80) as we only found one case of an elderly woman (90) with liquorice-related hypertension caused by medication.³

CASE HISTORY

Recently an 85-year-old woman was referred to our out-patient clinic because of progressive cognitive impairment for five years. Her performance in activities of daily living

was clearly impaired. Her single comorbid condition was hypertension, which she was known to have had for many years. The hypertension was diagnosed as essential hypertension and treated with a thiazide/amiloride diuretic. After her medical history had been taken (and also her son's), and after physical examination (no focal general or neurological pathology), assessment of cognition by Mini Mental State Examination (score 15, normal 30), CAMCOG (Cambridge cognitive examination: score 48, maximum 106; lower than 76 substantially increases the likelihood of dementia), and laboratory examination, we concluded she fulfilled the criteria for a dementia syndrome, probably due to Alzheimer's disease (according to the NINDS-ADRDA criteria) in a moderately severe stage.⁴ She refused neuro-imaging, so we could not completely rule out cerebrovascular disease, though her family did not report acute neurological events.

During physical examination we found a high systolic blood pressure (180/82 mmHg) in both supine and upright position. Routine laboratory investigations showed a serum sodium concentration of 144 mmol/l (normal 137-144), potassium 2.4 mmol/l (normal 3.5-5.0), bicarbonate 34.1 mmol/l (normal 24-30), and creatinine concentration 106 µmol/l. Because of the hypokalaemia, we discontinued diuretics and advised the patient's family to ensure that she eats potassium-rich food. After a diuretic-free period of three weeks the hypertension and hypokalaemia persisted (RR 210/100 mmHg, K 2.5 mmol/l), and we advanced the hypotheses of primary or pseudo-hyperaldosteronism. Additional laboratory investigations were performed. The plasma aldosterone was 0.03 nmol/l (normal 0.08-0.69) and the plasma renin concentration (upright) was 12 mE/l (normal 5-75). These findings supported the hypothesis of pseudohyperaldosteronism.

We re-questioned the possibilities of intoxication and repeated medical history taking. At this stage, her son told us she had been very fond of liquorice her whole life. At home he had found a stock of liquorice, and he now realised that he had seen his mother eating it, whatever the time of day he visited her. Reconsidering her liquorice intake, we estimated her intake of liquorice at about 500 g a day. The patient herself denied eating liquorice. We advised her children not to buy her any more liquorice. We also prescribed her potassium tablets; subsequently, the plasma potassium concentration normalised within two weeks. After a period of three weeks, we terminated the potassium supplementation. This did not lead to a renewed decrease in her plasma potassium level. This is in line with the hypothesis of pseudohyperaldosteronism by liquorice abuse. Because of persistent (systolic) hypertension one month after cessation of the liquorice ingestion, we started her on β -blockers. According to the literature, normalisation of the renin-aldosterone axis and blood pressure takes up to four to six months.⁵ After four months, the blood pressure, influenced by a low dose of a β -blocker (metoprolol 50 mg /day), was 142/68 mmHg. The hypertension returned after discontinuing medication (180/84 mm Hg), but was less high than during the liquorice abuse, so the low-dose β -blocker was re-started.

DISCUSSION

This case of a very old patient with liquorice-induced hypokalaemia and hypertension partially caused by liquorice abuse is instructive for more than one reason. First, this case is an alert for the possibility of secondary hypertension due to pseudohyperaldosteronism in the very old. Eating liquorice is mainly a habit in Northern European countries. On a worldwide scale, liquorice is used as an additive in foods and drinks because of a very sweet constituent called glycyrrhetic acid, which is the substance that causes hypertension and hypokalaemia. Furthermore liquorice is used in herbal drugs. Although the concentration of glycyrrhetic acid is the highest in candies, intoxication from other causes is well known. Liquorice should not be overlooked as a cause of hypertension and hypokalaemia in old age, especially in cases of diuretic drug use and a history of primary hypertension. Not recognising this cause of hypertension may easily lead to frequent hospital contacts and polypharmacy of more than one antihypertensive agent and potassium supplementation, as illustrated in the case presented by Farese *et al.*¹ It is possible to distinguish primary hypertension and hypertension due to glycyrrhetic acid by measuring the cortisol/cortisone ratio in arterial plasma or saliva.⁶ This ratio is sharply raised in pseudohyperaldosteronism, because glycyrrhetic acid inhibits the conversion of cor-

tisol into cortisone by 11β -hydroxysteroid dehydrogenase. In these higher concentrations, cortisol acts as the major endogenous mineralocorticoid compound. Together, the history of liquorice abuse, the low potassium, renin and aldosterone plasma levels, combined with the lowering of the hypertension and normalisation of the serum potassium after cessation of the liquorice abuse are sufficient evidence for the diagnosis of pseudohyperaldosteronism by liquorice abuse. Moreover, the patient probably suffers from essential (systolic) hypertension because of arterial wall stiffening, as is common in elderly patients. In our case we cannot rule out that the liquorice-related hypertension also caused cerebral damage and therefore may also be related to her cognitive decline. Russo *et al.* reported acute hypertensive encephalopathy in cases of more severe liquorice-induced hypertension.⁷ An even more important lesson to be drawn from this case is that, if we want to rule out intoxications, we should not limit medical history taking of elderly patients to merely questioning them about their intake of alcohol and nicotine. The case clearly illustrates that also in the very old one needs to be alert for the possibility of other intoxications. Moreover, patients with memory impairments are at risk to overeating of potentially toxic nutrients or drugs, by forgetting what and how much they eat. This is not limited to the Kluver-Bucy symptoms in frontal lobe dementia. In conclusion, because geriatric patients may forget what they eat or that they are overeating (or undernourishing) themselves, it is the task of geriatricians to actively search for these data, and to remember that not all hypertension in old age is essential hypertension.

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