CASE REPORT

Musical hallucinations responding to a further increase of carbamazepine

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SUMMARY

A 73-year-old woman outpatient with mild cognitive impairment, parasomnia and depressive state with musical hallucinations failed to respond to 400 mg/day of valproate. Once she was admitted to a university hospital, her musical hallucinations partially responded to 1 mg/day of clonazepam and sufficiently improved on 100 mg/day of carbamazepine. Two months after discharge, however, her musical hallucinations recurred probably as a consequence of psychological stress. The increase of carbamazepine from 100 to 200 mg/day completely remitted her musical hallucinations. This case suggests that musical hallucinations respond in a dose-dependent manner to increasing carbamazepine, and that gradual titration from small doses of carbamazepine is required because optimal doses appear to be smaller than those required for epilepsy and bipolar disorder. Further studies are warranted to determine the therapeutic levels of carbamazepine for musical hallucinations.

BACKGROUND

Musical hallucinations are considered as a variation of release hallucinations characterised by the perception of music without an external source.¹ The following types of patients are at increased risk for musical hallucinations: women, the elderly, patients with diseases of the ear, neurological and/or psychiatric disorders and patients receiving antidepressant treatment.^{1–4} Pharmacotherapy for musical hallucinations has been variously reported⁵ and carbamazepine is one of the treatment options⁴ because it can be assumed that carbamazepine may alleviate the excitation of the auditory cortex, although this assumption is yet to be determined. Moreover, it is presently unknown how carbamazepine should be titrated for musical hallucinations.

CASE PRESENTATION

The case is a 73-year-old woman outpatient with a 9-year history of depressive state treated by paroxetine. Approximately 2 years before this report, her husband died and she was living alone. One year ago, she began to experience parasomnia and musical hallucinations. The parasomnia manifested in episodes of eating from the refrigerator before going to bed, but then having no recollection of this the next morning. At that time she was highly anxious about the possibility that she had dementia because of memory problems and having burned a pan repeatedly due to forgetfulness. Of particular interest, she began to experience musical hallucinations, including the sound of a Japanese harp and

nursery rhymes. Also, she had episodes of sudden fainting and her doctor prescribed valproate (400 mg/day, 31.5 µg/mL) as a precautionary measure, despite no epileptic abnormality in her EEG. Thereafter, she was admitted to the psychiatric ward of our university hospital to further investigate her symptoms.

INVESTIGATIONS

- ▶ The pure tone audiometry revealed that she had hearing impairment of the right ear (40 db at 2000 Hz and 65 db at 8000 Hz) and of the left ear (55 db at 8000 Hz).
- ▶ The MRI showed cortical atrophy in bilateral frontal and temporal lobes, which was not clearly different from the previous images (from 2 years earlier).
- ▶ The mean cerebral blood flow (mCBF) assessed using single photon emission CT (SPECT) was less than normal (right 40.9 mL/100 g/min, left 40.9 mL/100 g/min).
- ▶ Cognitive function was assessed to be 25 points by Mini-Mental State Examination.
- ▶ The total τ and amyloid β 42 of cerebrospinal fluid were 181 pg/mL (normal range: <320 pg/mL)³ and 1004 pg/mL (normal range: >482 pg/mL),⁶ respectively.

DIFFERENTIAL DIAGNOSIS

Dementia.

TREATMENT

After admission, the patient received 50 mg/day of paroxetine, 400 mg/day of valproate and 0.25 mg/day of brotizolam, which replaced 10 mg/day of zolpidem, because her parasomnia was suspected to be a side effect of zolpidem. In fact, the change in hypnotics improved her parasomnia. Her musical hallucinations, however, persisted and 1 mg/day of clonazepam was added with a partial response. Of particular note, when paroxetine was reduced from 50 to 37.5 mg/day and incremented from 37.5 to 50 mg/day there was a corresponding improvement and exacerbation in her musical hallucinations. Instead of clonazepam, 100 mg/day (2.9–3.9 µg/mL) of carbamazepine was started, which substantially reduced the hallucinations.

OUTCOME AND FOLLOW-UP

Two months after discharge, however, her musical hallucinations recurred, probably as a consequence of psychological stress. The increase of carbamazepine from 100 to 200 mg/day (4.7 µg/mL) completely resolved her musical hallucinations again.

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DISCUSSION

Taking the findings of mild cognitive dysfunction, cortical atrophy and slightly low cerebral blood flow into consideration, this patient can be diagnosed as suffering from mild cognitive impairment. At the time of writing, the patient had not yet progressed to Alzheimer's dementia. Although her parasomnia might have been induced by zolpidem and her musical hallucinations might have been associated with paroxetine and hearing impairment, there is a possibility that these symptoms represented a prodromal state of dementia. Regardless of their origin, the hallucinations were very distressing for this patient. While valproate and clonazepam failed to bring about sufficient effect on her hallucinations, fortunately carbamazepine was sufficiently effective at 100 mg/day during hospitalisation. After discharge,

her hallucinations recurred but a further increase of carbamazepine to 200 mg/day brought about complete resolution.

These findings suggest that musical hallucinations may respond to increments of carbamazepine in a dose-dependent manner, and that a gradual titration from small doses is required because optimal doses appear to be smaller than those required for epilepsy and bipolar disorder. Further studies are warranted to establish the therapeutic doses and levels for musical hallucinations.

Contributors SA, TT, KH and NI designed this case report, analysed the clinical record, wrote the manuscript, approved the final version and take responsibility for publication.

Competing interests None.

Patient consent Obtained.

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Learning points

- ▶ Carbamazepine is one of the options of pharmacotherapy for musical hallucinations.
- ▶ Musical hallucinations may respond to a further increase of carbamazepine in a dose-dependent manner.
- ▶ Optimal doses appear to be smaller than those required for epilepsy and bipolar disorder.
- ▶ Gradual titration from small doses of carbamazepine is required to identify optimal doses.

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