CASE REPORT

Dementia complicated with Takotsubo cardiomyopathy associated with unconsciousness induced by Wernicke's encephalopathy

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SUMMARY

An 85-year-old woman who had been living alone and eating an unbalanced diet suddenly entered a neighbour's house. Her house was hot and humid due to lack of air conditioning caused by a loss of electrical power. After arrival, the patient exhibited disorientation, paresis of the right upper extremity, a tendency towards right conjugated deviation and perseveration. Electrocardiogram showed ST segment elevation and prolongation of the QT interval. Echocardiography suggested Takotsubo cardiomyopathy. The cardiac wall motion and neurological abnormalities improved after admission. The serum thiamine level was found to be low, which was compatible with a diagnosis of Wernicke's encephalopathy. Hasegawa dementia score was 10 points and the patient was suspected to have frontotemporal dementia. She was transferred to a nursing home with continuing dementia. In this case, psychological stress triggered by poor living circumstances induced by dementia and Wernicke's encephalopathy may result in the occurrence of Takotsubo cardiomyopathy.

BACKGROUND

This is a case of Takotsubo cardiomyopathy associated with Wernicke's encephalopathy in a patient with dementia. Such a combination has not been previously reported.

CASE PRESENTATION

An 85-year-old woman who had been living alone and eating an unbalanced diet suddenly entered a neighbour's house. She was in a state of confusion; therefore, she was transferred to our hospital. Her house was hot and humid due to lack of air conditioning caused by a loss of electrical power. Traces of vomiting were also observed in the patient's home. The patient had exhibited normal consciousness 1 week previously. She had a history of dermatomyositis, chronic thyroiditis, hypertension and hyperlipidaemia; therefore, she had prescriptions for thimazole, manidipine, predonine, oxatomido and pravastatin. She also had mild cognitive impairment; however, she lived independently in an institution for the elderly with the weekly assistance of a helper. Her sister and brother had both died of ischaemic coronary disease.

INVESTIGATIONS

After arrival, her vital signs were as follows: Glasgow Coma Scale, E4V4M5; blood pressure, 124/

98 mm Hg; pulse rate, regular at 62 bpm; saturation of peripheral oxygen on room air, 97%; and body temperature; 36.5°C. The physiological findings were negative. The patient exhibited disorientation, paresis of the right upper extremity, a tendency towards right conjugated deviation and perseveration. Chest roentography showed cardiomegaly (cardiothoracic ratio: 61%). ECG showed ST segment elevation and giant negative T-waves at the precordial leads with prolongation of the QT interval (figure 1). ECG performed 3 years earlier was normal. A complete blood count showed a white blood cell level of 7300/mm³, a haemoglobin level of 11.8 g/dl and a platelet count of 17.4 × 10⁴/mm³. Serum biochemistry revealed increased levels of creatine phosphokinase (CK 2062 IU/l), CK-MB isoenzyme (38, normal range; 0–6 IU/l), troponin T (0.660, normal range; 0–0.100 ng/ml), lactate dehydrogenase (464 IU/l) and mild dehydration. Echocardiography revealed akinesis of the apical portion of the left ventricle with compensatory hyperkinesis of the basal walls, suggesting Takotsubo cardiomyopathy (figure 2). The ejection fraction was 40%. A head MRI revealed mild atrophy and spotty white matter lesions with areas of periventricular hyperintensity on fluid-attenuated inversion recovery images and no significant signal changes on diffusion-weighted images.

TREATMENT

Owing to the patient's history of an unbalanced diet and confusion, she was administered thiamine via infusion under a suspected diagnosis of Wernicke's encephalopathy. Her circulation was stable; therefore, aspirin was prescribed for cardiac dysfunction, and observation with ECG monitoring and prescriptions of her routine drugs were applied. As she became hypotensive on the first day (BP 92/62 mm Hg), she was not administered an angiotensin-converting enzyme inhibitors, angiotensin receptor blockers or β -blockers.

OUTCOME AND FOLLOW-UP

Follow-up studies revealed an improvement in the cardiac wall motion and ECG findings within a few days. Within 1 week, the patient's consciousness disturbance and neurological abnormalities also improved. The serum thiamine level was found to be low (14 ng/ml; normal range: 24–66 ng/ml), which was compatible with a diagnosis of Wernicke's encephalopathy. Coronary angiogram obtained on the ninth hospital day exhibited

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Figure 1 ECG obtained on arrival shows ST segment elevation and giant negative T-waves at the precordial leads with prolongation of the QT interval.

negative findings, and left ventriculography revealed akinesis of the anterior wall and apex and hypokinesis of the inferior wall. The value of CK and troponin T decreased to the normal range on the 10th hospital day and the ejection fraction on ultrasound examination improved to 57% on the 17th hospital day. A cerebral blood flow scintiscan revealed cerebral hypoperfusion in the frontal and temporal lobes, and the revised Hasegawa dementia score was 10 points; therefore, the patient was suspected to have frontotemporal dementia. She was transferred to a nursing home on the 85th hospital day with continuing dementia.

DISCUSSION

We diagnosed the patient with Takotsubo cardiomyopathy because she exhibited transient abnormalities in cardiac wall

motion, elevated cardiac enzymes and ECG findings suggestive of Takotsubo cardiomyopathy without a significant coronary disease.¹ In addition, based on the patient's history of an unbalanced diet, the low serum thiamine level on arrival and the fact that the administration of thiamine resulted in improvements in consciousness and the neurological abnormalities, the patient was diagnosed with Wernicke's encephalopathy. She also exhibited progression of cognitive impairment due to frontotemporal dementia. Although the pathogenesis of Takotsubo cardiomyopathy is not clear at present, myocardial ischaemia caused by catecholamine-induced microvascular spasms or a neurogenic stunned myocardium triggered by psychological stress might be involved.² Accordingly, psychological stress triggered by poor living circumstances induced by dementia and Wernicke's encephalopathy may result in the occurrence of Takotsubo

Figure 2 Echocardiography performed on arrival reveals akinesis of the apical portion of the left ventricle with compensatory hyperkinesis of the basal walls, suggesting Takotsubo cardiomyopathy (left: diastolic, right: systolic phase).

cardiomyopathy in this case. Experimentally, thiamine deficiency in mice leads to decreased blood catecholamine levels.³ Clinically, human cases of Shoshin beri beri, a form of cardiomyopathy induced by thiamine deficiency, involve increased blood catecholamine levels.⁴ Therefore, the direct effects of thiamine deficiency on the development of Takotsubo cardiomyopathy cannot be determined based on previous reports.

Previous reports have demonstrated that cognitively impaired persons exhibit less emotional responsiveness; therefore, such patients rarely develop Takotsubo cardiomyopathy according to this theory.⁵ However, more recent works suggest that responsiveness is not as affected by dementing disorders as once believed. In fact, a few case reports have documented combinations of dementing disorders and Takotsubo cardiomyopathy, similar to this case report.^{5–7}

Learning point

- ▶ Takotsubo cardiomyopathy is a disorder characterised by a transient dysfunction of the apical portion of the left ventricle with compensatory hyperkinesis of the basal walls that produces ballooning of the apex with systole in the absence of coronary artery disease, which is associated with preceding acute medical illnesses and emotional or physical stress.
- ▶ Wernicke's encephalopathy is a disorder characterised by vitamin B1 (thiamine) deficiency caused by heavy drinking, an unbalanced diet or repetition of vomiting due to nausea gravidarum. The classic triad of the syndrome is confusion, ophthalmoplegia and ataxia.
- ▶ Psychological stress triggered by poor living circumstances induced by dementia and Wernicke's encephalopathy could be occurrence of Takotsubo cardiomyopathy.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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