Normal Pressure Hydrocephalus Presenting as Psychotic Symptoms: A Case Report

Normal pressure hydrocephalus (NPH) occurs when excessive cerebrospinal fluid (CSF) accumulates in ventricles of the brain. The typical clinical triad is gait disturbances, cognitive impairment, and urinary incontinence. Some patients with NPH may develop rare psychiatric symptoms. Because psychotic symptoms in NPH have rarely been reported, we are presenting a 78-year-old male patient with NPH, presenting himself with persecutory and jealousy delusions as dominating the disease course.

Case Report

A 78-year-old male patient had developed persecutory delusions 3 years before first psychiatric evaluation. His persecutory delusions had progressed gradually. One month before psychiatric admission, he became so agitated that he attempted to threaten his wife with a knife. He was then sent to a psychiatric emergency service and was admitted for further evaluation. In addition to his psychotic symptoms, broad-based, small-stepped gaits, and urinary incontinence were also noted by his family one year before admission. Before the hospitalization, he did not take any other medications. The results of neurological examination showed decreased bilateral deep tendon reflex, slow walking speed as a compensation for his unsteady gaits. The results of blood tests were all within normal limits. He had cognitive impairment with 9 of 30 in the Mini-Mental Status Examination (MMSE).

Patient's brain computed tomography (CT) showed enlargement of bilateral ventricles with mild widening of cortical sulci over frontal and temporal lobes (Figure 1). The Evan's index was 0.33, suggesting the possibility of NPH. Single-photon emission CT (SPECT) (Figure 2) disclosed decreased perfusion in bilateral inferior frontal gyri, bilateral anterior temporal regions and right basal ganglion.

During hospitalization, neurosurgeons were consulted and suggested the patient to receive 250 mg/day acetazolamide for NPH. He started to receive 100 mg/day of quetiapine. Nevertheless, his delusions were not fully remitted and the cognitive impairment was persisted. He had periodic fall accidents owing to gait disturbances. The patient neither received high volume lumbar puncture nor had lumbar drain trial because he could not cooperate. Surgical intervention was still suggested due to high risk of falls and poor drug response. He received ventricle peritoneum shunt implantation surgery afterward. His gait disturbances and cognitive impairment were prominently improved after the operation and the following

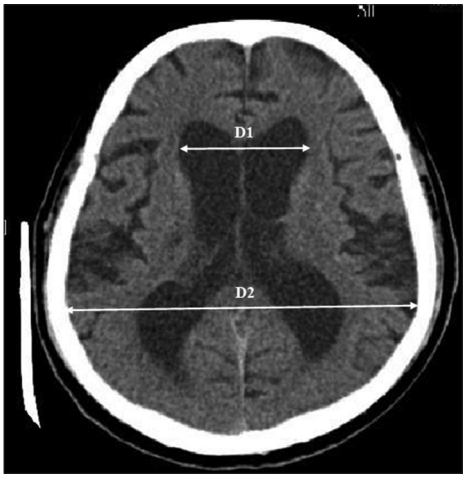

Figure 1. Computed tomogram of the brain without contrast showed enlargement of ventricles with mild cortical sulci widening over the frontal and the temporal lobe. The Evan's index, the ratio of D1 and D2, was 0.33, suggesting the possibility of normal pressure hydrocephalus. D1, the width of the frontal horns of the lateral ventricles; D2, maximum internal diameter of the skull.

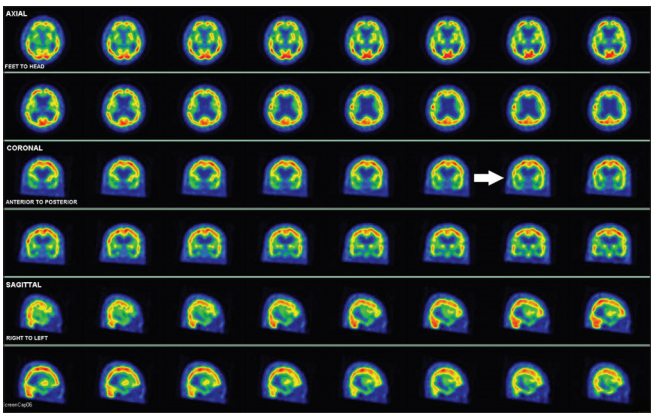

Figure 2. Single-photon emission computed tomogram showed the decrease of perfusion in bilateral inferior frontal gyri, bilateral anterior temporal regions, and right basal ganglion.

MMSE score was 17. His delusions were also subsided subsequently.

Comment

The patients have classic triad of NPH. Brain CT and SPECT findings might partially account for the etiologies of his clinical neuropsychiatric symptoms. The chronology of

symptoms and rapid resolution after shunting were compatible with the diagnosis of NPH.

NPH usually manifests the typical triad. But some studies suggested that psychiatric symptoms can be seen in the early course of NPH, delaying diagnosis [1]. In patients with NPH, psychiatric symptoms that have ever identified include personality change, anxiety, depression, mania, obsessive–compulsive symptoms, or even psychosis [1-3]. The pathophysiology of these neuropsychiatric symptoms in NPH may result from alternations in neurotransmitter activity or structural brain damage. One *in vivo* study has suggested reduced postsynaptic D_2 dopamine receptors with relatively preservation of normal presynaptic activity in NPH [4] while another study has shown remarkable elevated CSF dopamine levels in NPH patients [5]. In view of the correlation of cerebral region and hydrocephalic psychosis, some research disclosed that diencephalic and hypothalamic dysfunction is associated with mania, that abnormality in temporal lobe and orbital frontal region can bring about episodic aggression, that ventricular enlargement due to aqueduct stenosis can cause schizophreniform psychosis, and that apathy is related with thalamic region and anterior cingulate cortex [1]. In our case, the patient's neuropsychiatric symptom might be associated with abnormalities over the frontal and temporal lobe. As for the treatment, haloperidol, chlorpromazine, and risperidone have been reported to be effective [2, 3]. If symptoms persist, shunting procedure, a traditionally recommended treatment choice in NPH, can relieve psychiatric symptoms [2] (This case report was approved by the institution review board of Taoyuan Psychiatric Center for publication (protocol number = R20191111-1, date of approval = November 12, 2019). Written informed consent from the patient was also obtained for the purpose of publication.)

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Conflicts of Interest

There are no conflicts of interest.

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