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Reversible cerebral atrophy: a case report and literature review

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1. Introduction

Reversible cerebral atrophy is not a typically considered phenomenon in the clinical setting although it may be responsible for a variety of symptoms, from mild cognitive difficulty to dementia. We describe a patient with schizophrenia who was found to have reversible brain atrophy during an episode of delirium of multiple etiologies, which resolved after the delirium was treated. According to our PubMed search, these brain changes may be more common (as against popular belief) in clinical scenarios such as alcohol use [1], endogenous or exogenous steroid alterations, malnutrition—particularly in anorexia nervosa [2] and kwashiorkor [3], valproic acid use [4–6] and normal pressure hydrocephalus when treated with cerebrospinal fluid (CSF) shunting [7]. Reversible cerebral atrophy is likely underrecognized due to the fact that serial brain imaging is rarely obtained in any given patient. If a patient develops cognitive decline in the above scenarios, it may be worthwhile considering that it is due to reversible brain atrophy, especially since the treatment can be as simple as correcting the implicated etiology. Reversible cerebral atrophy has been hypothesized to be caused by fluid loss followed by fluid intake [8], dehydration [9], reversible white matter loss [10] and gray matter structural changes.

2. Case report

Ms. A, a 57-year-old female with schizophrenia and without alcohol or drug history, was hospitalized in September 2002 with severe psychosis. Her orientation and memory were preserved. Her home medications were benztropine, fluphenazine and nortriptyline. Twelve days after admission, she suffered a head trauma; the head CT showed a normal brain (Fig. 1). She failed trial administrations of quetiapine (800 mg), ziprasidone (160 mg), risperidone (8 mg) and olanzapine (20 mg), but she improved after ECT. She was discharged in November 2002 on benztropine, citalopram and haloperidol.

In April 2004, Ms. A again hit her head. Two days afterward, she became confused and refused to take her oral medication—haloperidol (20 mg), divalproex ER (1500 mg), citalopram (60 mg) and benztropine (2 mg/day). She was 3 weeks late in receiving her haloperidol decanoate and had not been eating adequately. At admission, 1 month later, she had poor eye contact, incoherent speech, auditory hallucinations, illogical thought process and impaired judgment and insight. Her blood pressure was 96/53 mmHg with a pulse of 65/min. She had hypoalbuminemia (2.8; range, 3.4–5 g/dl), thrombocytopenia, anemia, hypokalemia, hypochloremia, urinary tract infection and rhabdomyolysis. Although her creatinine phosphokinase value was 1108 u/L, it decreased quickly and no muscle rigidity was noted; therefore, neuroleptic malignant syndrome was ruled out. An ammonia level was not obtained; hence, we are not certain if this could have possibly been elevated and, thus, influence her mental status. Her head CT showed enlargement of the ventricles and sulci, when compared with the study in 2002. The radiologist concluded that the enlargement could reflect changes in hydration status or development of cerebral atrophy (Fig. 2). Normal pressure hydrocephalus was ruled out due to the acuity of onset, a nonataxic gait and diffuse cortical atrophy according to the head CT results. She was treated at the medical service unit for delirium of multiple etiologies, including dehydration

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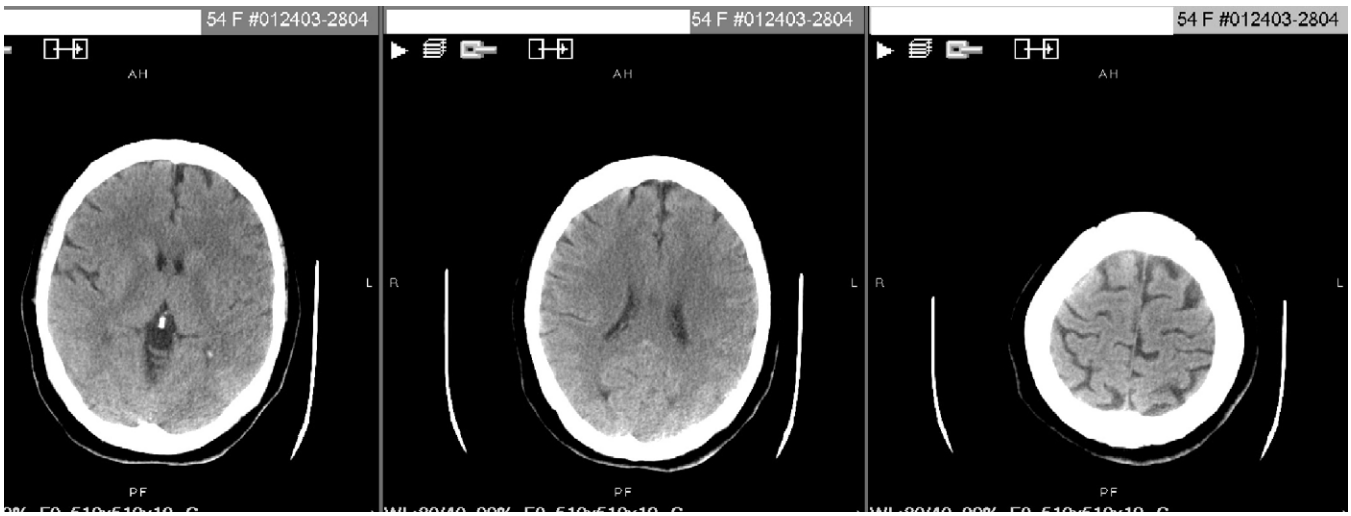

Fig. 1. Normal brain in September 2002.

and malnutrition. On admission, her BUN/Cr was elevated at 20/1.5, and she had concentrated urine with elevated urobilinogen, ketones and protein. The hemoglobin, hematocrit and platelet counts were corrected. Pancytopenia was attributed to divalproex sodium, which was discontinued. Upon transfer to psychiatry, her Mini Mental State Examination score was 21/30. She had poor coordination. Neurology suspected dementia. She had normal TSH, B12 and folate, and results from her HIV and RPR tests were negative. Neuropsychological testing showed impaired visual construction, visual perception, spatial processing, executive function, learning and memory. She recovered slowly and incompletely, and she was discharged in June 2004 to assisted living.

In December 2004, Ms. A was admitted for worsening psychosis. In addition to haloperidol decanoate (100 mg monthly), her home medications include daily doses of haloperidol (10 mg), citalopram (60 mg), benztropine (2 mg) and gabapentin (400 mg). She progressed to catatonia, and ECT was pursued. A head CT, as part of pre-ECT workup, showed ventricular system, sulci and basilar cisterns were normal for her age (Fig. 3). In the time between CT scans, the only significant adjustments made were discontinuation of valproic acid and improvement in nutritional status. Patient's psychosis went into remission again after ECT.

3. Literature review

Our case report describes brain atrophy that is possibly related to exposure to valproic acid and malnutrition, which resolved 6 months after eliminating these two putative causal factors. In the following paragraphs, we attempt to summarize the research in the area of reversible cerebral atrophy.

An early case report described reversible cerebral atrophy of the brain in a 17-year-old female with a seizure disorder, treated with valproic acid [4]. The patient, a 12th grade student, experienced significant apathy and declining school performance. A head CT scan showed an enlargement of ventricles, cisterns and cortical sulci, suggesting a diffuse

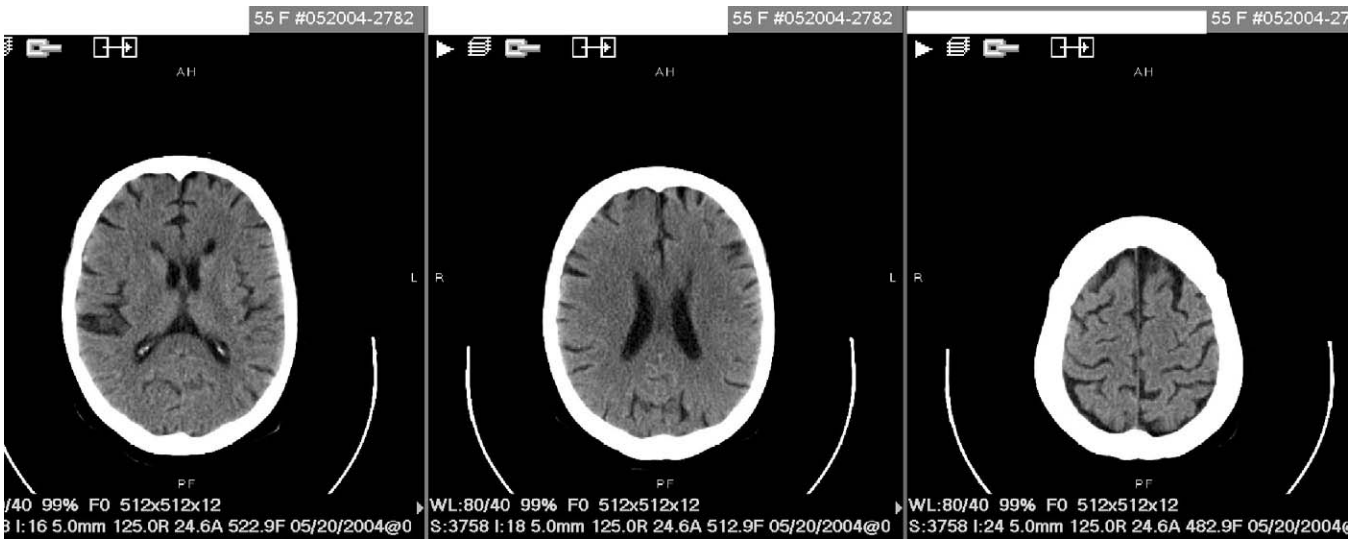

Fig. 2. Atrophied brain in April 2004.