Caso clinico

Dandy-Walker Syndrome with psychotic symptoms: a case report

Caso clinico di sindrome di Dandy-Walker con sintomi psicotici

ELISABETTA F. BUONAGURO[1], SARA CIMMAROSA[1], ANDREA DE BARTOLOMEIS[1]
E-mail: adebarto@unina.it

[1]Unit on Treatment Resistant Psychosis and Laboratory of Molecular Psychiatry, Section of Psychiatry, Department of Neuroscience, University School of Medicine Federico II, Naples

SUMMARY. Here we report the case of a patient with psychotic symptoms apparently resistant to antipsychotic treatments. Since the last admission in a psychiatric division the patient was diagnosed with Bipolar Disorder type I and then referred to our Outpatients Unit of Treatment Resistant Psychosis, where she was subsequently re-diagnosed with Dandy-Walker Syndrome. The Dandy Walker Complex is a congenital brain malformation involving the fourth ventricle and the cerebellum. We investigated the cognitive impairment of the patient and found deficits prominently in executive functions. This report may add further evidence on the importance of a correct diagnosis prior to defining a patient as treatment resistant and highlights cerebellar dysfunctions that may contribute to neuropsychiatric symptoms and cognitive impairment.

KEY WORDS: Dandy-Walker Syndrome, treatment resistant schizophrenia, cognitive impairment, cerebellum, psychosis.

RIASSUNTO. Viene qui presentato il caso di una paziente con sintomi psicotici apparentemente resistenti al trattamento farmacologico. La paziente riceveva diagnosi di disturbo bipolare di tipo I nel corso dell'ultimo ricovero e veniva successivamente ammessa presso l'Ambulatorio di Farmacoresistenza dove si formulava diagnosi di sindrome di Dandy-Walker. Il Dandy Walker Complex è una malformazione cerebrale congenita che coinvolge il quarto ventricolo e il cervelletto. Dallo studio del deficit cognitivo della paziente è emersa una chiara compromissione delle funzioni esecutive. Questo caso vuole sottolineare l'importanza di una corretta diagnosi prima di definire un paziente come resistente al trattamento farmacologico e il ruolo delle disfunzioni cerebellari nella comparsa di sintomi neuropsichiatrici e deterioramento cognitivo.

PAROLE CHIAVE: sindrome di Dandy-Walker, schizofrenia resistente al trattamento, disfunzioni cognitive, cervelletto, psicosi.

INTRODUCTION

The contribution of the cerebellum to functions other than movement coordination has been widely recognized. Cerebellar structures are considered to be involved in cognitive, emotional and behavioral processes[1]. Multiple evidence has pointed out the involvement of the cerebellum in the pathophysiology of several psychiatric illnesses such as schizophrenia and mood disorders[2]. The description of the cerebellar cognitive-affective syndrome (CCAS) in subjects with either congenital or acquired cerebellar lesions has provided a model of behavioral dysfunctions and cognitive impairments related to abnormal functions of the cerebellum[3].

The Dandy-Walker Complex (DWC) comprises multiple developmental abnormalities of the cerebellum, including: Dandy-Walker Variant, Dandy-Walker Malformation, Mega Cisterna Magna, and posterior fossa arachnoid cyst[4].

The DWC has been characterized as a triad of malformations: dilatation of the fourth ventricle, complete or partial agenesia of the cerebellar vermis, enlarged posterior fossa with displacement of the tentorium. The DWC has been variably described in association with atypical psychosis[5,6].

Here we describe a case of atypical psychotic symptoms with cognitive impairment in a patient referred to our Unit on Treatment Resistant Psychosis, then diagnosed with Dandy-Walker Syndrome. Notably, it has been reported that confounding factors in defining treatment resistant schizophrenia may be misdiagnosis, organic psychosis or somatic diseases[7,8].

CASE REPORT

A 29-year-old female with a 9-year history of psychiatric symptoms was admitted to our Unit on Treatment Resistant Psychosis after being previously diagnosed with either Schizophrenia, Delusional Disorder, Schizoaffective Disorder or Bipolar Disorder type I, according to the Diagnostic and Statistic Manual of Psychiatric Disorders IV version, text revised (DSM-IV-TR).

Before our observation, the patient reports that she was first hospitalized with the diagnosis of Schizophrenia at the age of 20.

However, the first documented hospitalization occurred two years later, due to delusional thoughts, suspiciousness and aggressive behavior. The patient was diagnosed with Bipolar Disorder type I and treated with lithium and valproate, which she discontinued after few months. In the following three years, the patient had three compulsory admissions to local psychiatric hospitals. Hospitalizations were due to episodes of agitation and aggressiveness, and she was discharged after each admission to a psychiatric unit with a different diagnosis. In chronological order she was diagnosed with: Delusional Disorder, Bipolar Disorder type I, Schizoaffective Disorder, and was treated with risperidone, valproate plus pimozide, or haloperidol plus valproate, respectively.

Since the last admission to a psychiatric division one year ago, the patient was diagnosed with Bipolar Disorder type I and prescribed the following therapy: valproate 750 mg/die, haloperidol 4 mg/die, biperidene 4 mg/die. Subsequently, the patient was referred to our Unit on Treatment Resistant Psychosis and, at the time of our evaluation, mental status examination revealed blunted affect, poor rapport, suspiciousness, mild cognitive deficits and persecutory delusions. The patient gave written informed consent to all diagnostic procedure as well as she allowed us to use the available data for scientific reports. The patient was born at term but reported a history of birth asphyxia. She is the first child of non-consanguineous parents. Premorbid physical growth was reported as normal, whereas personal history revealed irritability and drowsiness. She graduated from high school but did not attend university due to poor academic abilities. The patient was unemployed at the time of the admission to our Unit on Treatment Resistant Psychosis. There was no family history of neurological or psychiatric illnesses. No alcohol or substance abuse was reported. The patient was administered with a range of rating scales: PANSS (Positive and Negative Syndrome Scale, score 70), SCID-I (Structured Clinical Interview for DSM-IV Axis I Disorders, which resulted in a diagnosis of Psychotic disorder not otherwise specified, NOS), Mini-Mental State Examination (pathological score of 25/30, with deficits in calculation and complex commands). The SCID-II (Structured Clinical Interview for DSM-IV Axis II Disorders) assessment revealed no personality disorders. To note, a subsequent MMPI (Minnesota Multiphasic Personality Inventory) showed high rates of lying propensity.

The patient performed poorly on the BACS (Brief Assessment of Cognition in Schizophrenia), showing significant lower scores than normal controls on working memory, processing speed and executive functions tasks. The patient also performed poorly on the Verbal Fluency Test and the Attentional Matrix. Verbal IQ and Performance IQ on Wechsler Adult Intelligence Scale-Revised (WAIS-R) were abnormally different, which confirmed deficits in executive functions and visuo-spatial ability.

Physical examination and laboratory results were normal. Neurological examination and EEG were unremarkable. Magnetic Resonance (MR) scanning was suggestive for a Dandy-Walker Syndrome with enlargement of cisterna magna, partial hypoplasia of the cerebellar vermis and enlargement of the fourth ventricle (Figure 1). Chromosomal analysis demonstrated a normal karyotype. The diagnosis of Dandy-Walker Syndrome was consistent with our prior diagnosis of Psychosis NOS.

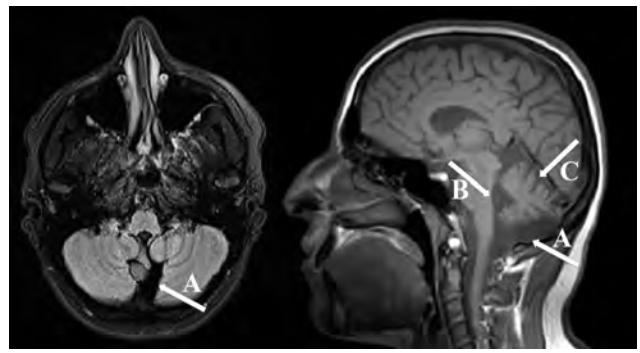

Figure 1. MR cross-sectional (*left*) and midsagital (*right*) T1-weighted scans showing enlargement of cisterna magna (A), enlargement of the fourth ventricle (B), and partial hypoplasia of the cerebellar vermis (C).

DISCUSSION AND CONCLUSIONS

This report shows a case of neuropsychiatric symptoms potentially related to impairments in cerebellar functions. The spectrum of psychiatric symptoms in DWC ranges from psychotic to cognitive ones, impacting symptom domains similar to those impaired in schizophrenia[5,6,9]. In clinical practice, it has been estimated that 20 to 50% of schizophrenic patients have no adequate response to antipsychotics and are categorized as treatment resistant[10]. However, misdiagnosis has been regarded as a prominent cause of non-response[7,8] and should be thoroughly investigated before considering a patient as treatment resistant.

This case report may support previous evidence on the role of the cerebellum in the pathophysiology of psychiatric symptoms. It has been observed that schizophrenic patients have altered cortico-cerebellar connectivity. The cortico-thalamic-cerebellar-cortical circuit (CTCCC) has been proposed to have a role in the coordination and monitoring of the fluent execution of mental activity[11]. Disruption of this circuitry has been postulated to underlie cognitive impairment and clinical symptoms of schizophrenia[12]. Structural MR analyses have yielded consistent reports of cerebellar atrophy in schizophrenia[13-15]. Furthermore, the conceptualization of the CCAS as a result of acquired or congenital cerebellar lesions envisions a precise role of the cerebellum in cognition and behavior[16]. Prominent features of the CCAS include deficient planning of actions, impaired abstract reasoning and working memory, decreased spatial cognition, decreased verbal fluency, impulsiveness, disinhibition, psychotic symptoms, and aggressive behavior[3]. Interestingly, a significant number of these features were found in the report described. Therefore, the clinical presentation of this case is consistent with the view that brain developmental abnormalities involving the cerebellum may contribute to psychotic and cognitive symptoms resembling schizophrenia-like disorders.

BACS and WAIS-R results revealed prominent deficits in executive functions but not in verbal memory, which is frequently impaired in schizophrenic patients[17,18]. Neuroimaging studies have shown a relatively consistent pattern of task-related cerebellar abnormalities in schizophrenia, particularly in the vermis[19]. Instead, neocerebellar regions may be activated during tasks as memory encoding and retrieval in healthy volunteers[20]. Therefore, vermis abnormalities such as those observed in our patient are not expected to impact

memory functions. These findings may support the role of distinct regions of the cerebellum in the pathophysiology of different neuropsychiatric symptoms and may putatively explain the lack of impairment obtained from our patient at the Verbal Memory Task. Therefore, this cognitive pattern may contribute to discriminate schizophrenic patients from cases, such as that described herein, where psychotic symptoms might be related to morphological brain lesions.

REFERENCES

1. Baillieux H, De Smet HJ, Paquier PF, De Deyn PP, Marien P. Cerebellar neurocognition: insights into the bottom of the brain. Clin Neurol Neurosurg 2008; 110: 763-73.
2. Konarski JZ, McIntyre RS, Grupp LA, Kennedy SH. Is the cerebellum relevant in the circuitry of neuropsychiatric disorders? J Psychiatry Neurosci 2005; 30: 178-86.
3. Schmahmann JD, Sherman JC. The cerebellar cognitive affective syndrome. Brain 1998; 121 (Pt 4): 561-79.
4. Parisi MA, Dobyns WB. Human malformations of the midbrain and hindbrain: review and proposed classification scheme. Mol Genet Metab 2003; 80: 36-53.
5. Turner SJ, Poole R, Nicholson MR, Ghadiali EJ. Schizophrenia-like psychosis and Dandy-Walker variant. Schizophr Res 2001; 48: 365-7.
6. Gan Z, Diao F, Han Z, et al. Psychosis and Dandy-Walker complex: report of four cases. Gen Hosp Psychiatry 2012; 34: 102.e7-02.e11.
7. Maia-de-Oliveira JP, Pinto JP, Alexandre V, et al. A false case of clozapine-resistant schizophrenia. Case Report Med 2010; 2010: 534027.
8. Duwe BV, Turetsky BI. Misdiagnosis of schizophrenia in a patient with psychotic symptoms. Neuropsychiatry Neuropsychol Behav Neurol 2002; 15: 252-60.
9. Ferentinos PP, Kontaxakis VP, Havaki-Kontaxaki BJ, Paplos KG, Pappa DA, Soldatos CR. Refractory psychosis and prominent cognitive deficits in a patient with mega-cisterna magna. Prog Neuropsychopharmacol Biol Psychiatry 2007; 31: 561-3.
10. Lehman AF, Lieberman JA, Dixon LB, et al. Practice guideline for the treatment of patients with schizophrenia, second edition. Am J Psychiatry 2004; 161: 1-56.
11. Andreasen NC, O'Leary DS, Cizadlo T, et al. Schizophrenia and cognitive dysmetria: a positron-emission tomography study of dysfunctional prefrontal-thalamic-cerebellar circuitry. Proc Natl Acad Sci U S A 1996; 93: 9985-90.
12. Andreasen NC, Paradiso S, O'Leary DS. "Cognitive dysmetria" as an integrative theory of schizophrenia: a dysfunction in cortical-subcortical-cerebellar circuitry? Schizophr Bull 1998; 24: 203-18.
13. Okugawa G, Sedvall G, Nordstrom M, et al. Selective reduction of the posterior superior vermis in men with chronic schizophrenia. Schizophr Res 2002; 55: 61-7.
14. Levitt JJ, McCarley RW, Nestor PG, et al. Quantitative volumetric MRI study of the cerebellum and vermis in schizophrenia: clinical and cognitive correlates. Am J Psychiatry 1999; 156: 1105-7.
15. Ichimiya T, Okubo Y, Suhara T, Sudo Y. Reduced volume of the cerebellar vermis in neuroleptic-naive schizophrenia. Biol Psychiatry 2001; 49: 20-7.
16. Hart H. The cerebellum, cognition, and behaviour. Dev Med Child Neurol 2011; 53: 1069-70.
17. Toulopoulouand T, Murray RM. Verbal memory deficit in patients with schizophrenia: an important future target for treatment. Expert Rev Neurother 2004; 4: 43-52.
18. Gold J, De Girolamo G, Brambilla L, et al. Schizofrenia e funzioni cognitive: una revisione critica della letteratura. 1. Modelli sperimentali e valutazione dei deficit cognitivi. Riv Psichiatr 2002; 37: 1-13.
19. Paradiso S, Andreasen NC, Crespo-Facorro B, et al. Emotions in unmedicated patients with schizophrenia during evaluation with positron emission tomography. Am J Psychiatry 2003; 160: 1775-83.
20. Andreasen NC, O'Leary DS, Arndt S, et al. Short-term and long-term verbal memory: a positron emission tomography study. Proc Natl Acad Sci U S A 1995; 92: 5111-5.