ORIGINAL ARTICLE

Brain Imaging Abnormalities in Autism Disorders

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ABSTRACT

Background: Autism disorders are heterogeneous complex group of chronic disorders that have become increasingly known as pervasive developmental disorders since the 1980s. They include five main disorders associated with significant early impairment in socialization, communication, and behavior. Autism disorders have recently been called autism spectrum disorder mostly by the American Psychiatric Association, and the term pervasive developmental disorders have been used with the term autism spectrum disorder interchangeably. The association of autism disorders with significant brain imaging abnormalities has been infrequently reported. The aim of this paper is to report the association of brain imaging abnormalities in four autistic children. **Patients and Methods:** Four autistic patients (three boys and one girl) who had brain imaging abnormalities and observed at the Children Teaching Hospital of Baghdad Medical City are described. **Results:** Three patients had atypical autism with mental retardation, and one boy had Heller syndrome (childhood disintegrative disorder). The girl had right anterior basal temporal small arachnoid cyst on computed tomography (CT) scan. One of the boys with atypical autism also had mild cerebral palsy attributed to birth asphyxia and his CT scan showed evidence of slight brain atrophy with mild dilatation of the ventricular system. **Conclusion:** Brain imaging abnormalities in patients with autism disorders include arachnoid cyst, agenesis of the corpus callosum, evidence of vasculitis (in Heller syndrome), and brain imaging abnormalities related to a coexisting condition such as cerebral palsy.

Key words: Agenesis of the corpus callosum, arachnoid cyst, autism disorder, brain imaging

INTRODUCTION

Autism disorders are heterogeneous complex group of chronic disorders that have become increasingly known as pervasive developmental disorders since the 1980s. They include five main disorders associated with significant early impairment in socialization, communication, and behavior. Autism disorders have recently been called autism spectrum disorder mostly by the American Psychiatric Association, and the term pervasive developmental disorders have been used with the term autism spectrum disorder interchangeably. Autism disorders were first described by Grunya Efimovna Sukhareva in 1925; she was a Soviet pediatric psychiatrist who called these disorders autistic psychopathy. The hallmark of autism disorders is the characteristic association with impairments in social interaction and communication and behavioral problems.[1-9]

The classical form of autism is characterized by normal intelligence and poor speech development was sometimes called Kanner's syndrome because it was first reported by Leo Kanner in 1943. Patients with Asperger syndrome also had normal intelligence, but it is characterized by the absence of significant impairment in language development. Asperger syndrome was first described by Grunya Efimovna Sukhareva and later by Hans Asperger in 1944. The autistic psychopathy reported in 1925 by Grunya Efimovna Sukhareva and Hans Asperger was similar, and it was called Lorna Wing "Asperger syndrome" in her 1981 publication of a series of case studies of children having the disorder.[3,6] Children having autism with poor language development and subnormal intelligence but without significant mental retardation are generally considered to have typical rather than the classical autism of Leo Kanner.[1-5] Children who have autism with significant mental retardation are generally considered to have atypical autism disorder (pervasive developmental disorder not

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otherwise specified), a category which may also include regressive autism.[1-3,10,11]

Rett syndrome was most probably first reported in German language in 1966 by Andreas Rett, a pediatrician in Vienna, Bengt Hagberg.[3,6,7]

Heller syndrome which is also called "childhood disintegrative disorder," is characterized by a significant developmental regression resulting in deterioration in behavioral and adaptive functioning including self-help skills with loss of language and social skills after a period of normal development for at least 2 years.[3,6,8,9] The condition was first reported in 1908 by Theodor Heller in his paper "Über Dementia Infantilis." He called the condition "Dementia infantilis."[3,6,8,9]

The association of autism disorders with significant brain imaging abnormalities has been infrequently reported.[12,13] The aim of this paper is to report the association of brain imaging abnormalities in four autistic children.

PATIENTS AND METHODS

Four autistic patients (three boys and one girl) who had brain imaging abnormalities and observed at the Children Teaching Hospital of Baghdad Medical City are described.

RESULTS

The first patient was a 4½-year-old girl [Figure 1] who had atypical autism with mental retardation as evident by poor adaptive skill including lack of bowel control and poor spoon feeding with spilling when eating with spoon. Brain computed tomography (CT) scan at the age of 4 years showed right anterior basal temporal small arachnoid cyst (23 mm ×7 mm × 16 mm). CT scan also showed that the cisterna pontis and C-P cisterns were prominent on both sides with low density. The CT scan report also suggested the possibility of epidermoid cyst. Brain magnetic resonance imaging confirmed the presence of a right anterior basal temporal (24 mm × 8 mm × 17 mm) with clean cerebrospinal fluid. MRI also showed atrophic changes of the right temporal lobe. The girl was previously enrolled in a therapeutic study aiming at achieving cure of autistic symptoms, and it was possible to demonstrate curing her autistic features at the end of the study.[10,11]

The second patient was a 5-year-old boy [Figure 2] who also had atypical autism with mental retardation as evident by poor adaptive skill including lack of bowel control and poor spoon feeding with spilling when eating with spoon. He also had significant behavioral abnormalities including biting others. In addition, he had mild spasticity gait abnormalities attributed to birth asphyxia and his CT scan showed evidence of slight brain atrophy with mild dilatation of the ventricular

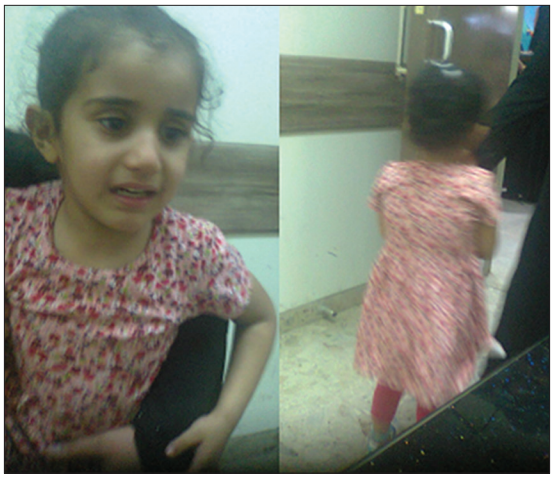

Figure 1: The first patient had atypical autism. At the clinic, she showed autistic features including not responding to her name, and poor eye contact

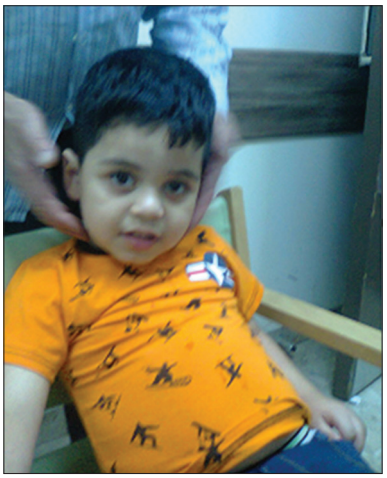

Figure 2: The second patient was a five-year old boy who also had atypical autism. At the clinic, he showed autistic features including not responding to his name, and poor eye contact

system. The boy obviously had mild cerebral palsy. The boy was also previously enrolled in a therapeutic study aiming at achieving cure of autistic symptoms, and he experienced improvement in autistic features and gait abnormalities.[10,11]

The third patient was a 13-year-old boy with severe atypical autism and epilepsy, and CT scan showed agenesis of the corpus callosum.

The fourth patient was a 10-year-old boy [Figure 3] who had Heller syndrome (childhood disintegrative disorder). The child's development was considered normal by the age of 4 years. Thereafter, he experienced gradual deterioration in speech, cognition, adaptive self-care skills, and the development of abnormal behaviors including motor stereotypies. Within several months, the boy reached a state

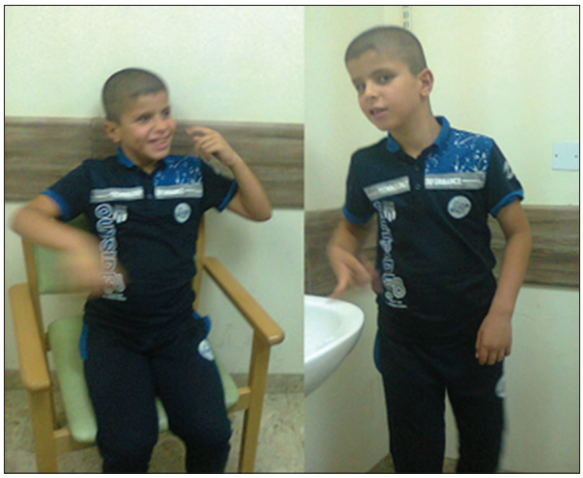

Figure 3: At the clinic, the boy showed marked repetitive movements, and was rather uncontrollable and tried to move from place to place in the room

of overtly bizarre behavior and dementia, and was saying nothing. His motor functions remained good and enabled him to do things like bizarre dancing. Early during the course of his illness, brain CT scan showed normal findings. However, brain MRI performed at about the age of seven showed single small right parietal hyperintense signal suggesting vasculitis.

DISCUSSION

This paper showed that the very complex nature of autistic disorders can be further complicated by the association with a cerebral abnormality that makes interpretation of the contribution of theses abnormalities to the autistic symptoms. In the first patient, the cure of autistic features with medical therapies makes it very difficult to attribute her autistic disorders to the arachnoid cyst. The second boy who had mild cerebral, the cerebral abnormalities can explain his neurologic abnormalities, but it is not logic to attribute his autistic features to the cerebral abnormalities. The same thing also applies to the third and fourth patients.

In patients with classical autism, typical autism, and Asperger syndrome, brain imaging studies are commonly negative and such studies are not routinely performed.[1,14]

CONCLUSION

Brain imaging abnormalities in patients with autism disorders include arachnoid cyst, agenesis of the corpus callosum, evidence of vasculitis (in Heller syndrome), and brain imaging abnormalities related to a coexisting condition such as cerebral palsy.

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Some of the figures were included in previous publications, and the author has their copyrights.

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