

Attention Deficit Hyperactivity Disorder in a Patient With Congenital Mirror Movement Disorder and Colpocephaly

Selcen Yaroglu Kazanci^{1*}

¹Bakirkoy Dr. Sadi Konuk Education and Training Hospital, Istanbul, Turkey

*Corresponding author: Selcen Yaroglu Kazanci, Bakirkoy Dr. Sadi Konuk Education and Training Hospital, Istanbul, Turkey. Tel: +90-212-41471715031, E-mail: selcenkazanci@yahoo.com.tr

Received: April 7, 2015; Revised: July 3, 2015; Accepted: August 7, 2015

Introduction: Congenital mirror movement disorder designates involuntary movements on one side of the body that occur as mirror of the intentional movements on the contralateral side. Colpocephaly is described as persistence of fetal configuration of lateral ventricles.

Case Presentation: A two-month old male infant was brought to the hospital due to bilateral identical movements of the hands. Except for bilateral involuntary synkinetic imitative movements in hands, neurological and physical examination was normal. Cranial MRI showed corpus callosum dysgenesis, hypogenesis and dilation of bilateral lateral ventricular posterior horns (colpocephaly). At the age of 7 years, he was started to use metylphenydate to mitigate attention deficit and hyperactivity disorder. The mirror movements were decreasing in amplitude by years and were not so serious to affect normal life activities.

Conclusions: Mirror movements, diagnosed usually during childhood, may be congenital or secondary to neurological diseases. Although they generally do not affect normal life activities, in some cases severity of mirror movements causes a real debilitating disease. In our case the patient was diagnosed at the age of 2 months and on follow-up no debilitating problems were observed. This is the first case to describe the association of colpocephaly and mirror movements. The exact mechanism of this association is not known. Although it is known that mirror movements may be in relation with some psychiatric pathologies, this is the first report of attention deficit and hyperactivity disorder in conjunction with mirror movements and/or colpocephaly. Managing comorbidities, either physical or psychological, will help the patient to live in good health without trying to cope with other pathological diseases.

Keywords: Mirror Movements; Colpocephaly; Attention Deficit and Hyperactivity Disease; Corpus Callosum Hypogenesis

1. Introduction

Congenital mirror movement disorder, involuntary movements on one side of the body that occur as mirror of the intentional movements on the contralateral side, is an autosomal-dominant or sometimes sporadic disease. Mirror movements (MM) may be associated with many diseases like cerebrovascular disease, Klippel-Feil syndrome, corpus callosum dysgenesis, Moebius syndrome, septo-optic dysplasia and Kallman syndrome (1-5).

Colpocephaly is described as persistence of fetal configuration of lateral ventricles. It has been found in association with absent corpus callosum (6, 7).

Although in the literature association of colpocephaly and congenital mirror syndrome is not reported, both diseases are shown to be in association with corpus callosum dysgenesis. Herein we report a case with congenital mirror movements, colpocephaly, corpus callosum hypogenesis and attention deficit hyperactivity disorder (ADHD). So far it is the first case reported in the literature with association of ADHD and congenital mirror movements, colpocephaly and/or corpus callosum dysgenesis.

2. Case Presentation

Parents of this 2-month old male infant were complaining of bilateral identical movements of the hands of the child. He was born to healthy and non-consanguineous parents by spontaneous delivery at 37th gestational week with 2,950 gr birth weight, 49 cm birth length. There was no family history. He was breast feeding. The physical examination was normal. A complete physical and neurological examination was performed and mirror movements were assessed according to the Woods and Teuber grading scale (8). Except for bilateral involuntary synkinetic imitative movements in hands, neurological examination was normal. Amplitude of the intentional movements were greater than involuntary movements of the contralateral hand. At first, transfontanel ultrasonography was performed to evaluate brain which showed corpus callosum hypogenesis and then cranial MRI was performed to assess brain exactly. Corpus callosum dysgenesis, hypogenesis and dilation of bilateral lateral ventricular posterior horns (colpocephaly) were detected. The patient was asymptomatic except for mir-

ror movement of the hands. On follow-up, he started to walk at 13 months and started to say one word nearly at 15 months of age. He was cooperating well. Motor-mental developmental steps were appropriate for his age.

At the age of 7 years, he was referred to child psychiatrist because of hyperactivity and inability to concentrate in the school. After psychiatric evaluation he was started to use methylphenydate due to attention deficit and hyperactivity syndrome. He was free of symptoms after 1 year of methylphenydate treatment. No other serious physical or psychological disease occurred. The mirror movements were decreasing in amplitude by years and were not so serious to affect normal life activities.

3. Discussion

Mirror movements are usually diagnosed during childhood (9). Mirror movements may be congenital or secondary to neurological diseases (7, 10, 11). Although they generally do not affect normal life activities, in some cases severity of MM causes a real debilitating disease. In our case the patient was diagnosed at the age of 2 months and on follow-up no debilitating problems were observed.

The pathophysiology of the mirror movements has not been exactly elucidated yet. Pathophysiological mechanism of MM depends on the pathological condition. Jain et al. (12) showed that the mirror movement-like deficits are associated with defect of axonal guidance in two identified groups of commissural reticulospinal hindbrain neurons. Zebrafish dcc mutants were used to clarify this pathway. Axons of these neurons usually do not cross the midline and project ipsilaterally. Overactivation of ipsilateral corticospinal tract is the major hypothesis (11). In some cases, as in our patient, the association of corpus callosum dysgenesis and MM was illustrated which may elucidate the hypothesis of Jain et al. (12) and Rasmussen (11).

Colpocephaly is disproportionate enlargement of the occipital horns of the lateral ventricles. It is usually associated with multiple neurological syndromes including agenesis of the corpus callosum (9). It is assumed to occur as a result of neuronal migration disorders during early brain development and other central nervous system disorders (13). There is no known association of colpocephaly and MM in the literature. Our case is the first to describe the association of colpocephaly and MM. The exact mechanism of this association is not known. It may be an association or just an incidence of comorbidities. Cases reported about this association will help to clarify the mechanism.

Although it is known that MM may be in relation with some psychiatric diseases, this is the first report of ADHD in conjunction with MM and/or colpocephaly (14). When

the parents of the patients with MM and/or colpocephaly suffer from hyperactivity and unsuccess of learning new things, the child should be evaluated for ADHD. Unfortunately, up to date, there is no really effective treatment for MM or colpocephaly. So managing comorbidities like ADHD, either physically or psychologically, will help the patient to live in good health without trying to cope with other pathological diseases.

Funding/Support

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

References

1. Koenigkam-Santos M, de Castro M, Versiani BR, Diniz PR, Santos AC. Kallmann syndrome and mirror movements: White matter quantitative evaluation with magnetic resonance imaging. *J Neurol Sci*. 2010;**292**(1-2):40-4.
2. Webb BD, Frempong T, Naidich TP, Gaspar H, Jabs EW, Rucker JC. Mirror movements identified in patients with moebius syndrome. *Tremor Other Hyperkinet Mov (N Y)*. 2014;**4**:256.
3. Yucel M, Oz O, Demir O, Akgun H, Karadas O, Ulas UH, et al. The Association Between Corpus Callosum Hypogenesis and Mirror Movement: The Study of Transcranial Magnetic Stimulation. *J Neurol Sci Turk*. 2012;**29**(2):351-6.
4. Norton JA, Thompson AK, Chan KM, Wilman A, Stein RB. Persistent mirror movements for over sixty years: the underlying mechanisms in a cerebral palsy patient. *Clin Neurophysiol*. 2008;**119**(1):80-7.
5. Karatas H, Saygi S. Two cases of septo-optic dysplasia-plus syndrome with epilepsy and mirror hand movements. *Epilepsy Behav*. 2009;**15**(2):245-8.
6. Ansary A, Manjunatha CM, Ibbanesebhor S. Prenatal diagnosis of colpocephaly with absent corpus callosum. *Scott Med J*. 2015;**60**(1):e19-23.
7. Bartolome EL, Cottura JC, Britos Frescia R, Dominguez RO. Asymptomatic colpocephaly and partial agenesis of corpus callosum. *Neurologia*. 2014.
8. Woods BT, Teuber HL. Mirror movements after childhood hemiparesis. *Neurology*. 1978;**28**(11):1152-7.
9. Rebai I, Benrhouma H, Kraoua I, Drissi C, Ben Hammouda M, Gouider-Khouja N. Mirror movements and myelomeningocele: report of a single case and review of literature. *Iran J Child Neurol*. 2013;**7**(3):58-61.
10. Volpe P, Paladini D, Resta M, Stanziano A, Salvatore M, Quarantelli M, et al. Characteristics, associations and outcome of partial agenesis of the corpus callosum in the fetus. *Ultrasound Obstet Gynecol*. 2006;**27**(5):509-16.
11. Rasmussen P. Persistent mirror movements: a clinical study of 17 children, adolescents and young adults. *Dev Med Child Neurol*. 1993;**35**(8):699-707.
12. Jain RA, Bell H, Lim A, Chien CB, Granato M. Mirror movement-like defects in startle behavior of zebrafish dcc mutants are caused by aberrant midline guidance of identified descending hindbrain neurons. *J Neurosci*. 2014;**34**(8):2898-909.
13. Puvabanditsin S, Garrow E, Ostrerov Y, Trucanu D, Ilic M, Cholenkeril JV. Colpocephaly: a case report. *Am J Perinatol*. 2006;**23**(5):295-7.
14. Artigas Pallares J, Fernandez Alvarez E, Lorente Hurtado I. [Mirror movement. Review of 11 cases]. *An Esp Pediatr*. 1989;**31**(6):559-63.