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SHORT COMMUNICATION

Connective tissue problems and attention deficit and hyperactivity

Carolina Baeza-Velasco · Myriam Soussana · Amaria Baghdadli

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To the Editor,

The heritable disorders of the connective tissue are a group of genetic disorders affecting connective tissue matrix proteins that classically include Marfan syndrome (MFS), Ehlers–Danlos Syndrome (EDS), benign joint hypermobility syndrome and osteogenesis imperfecta (Grahame 2000). As connective tissue is found throughout the body, the clinical manifestations of these disorders are varied, including disturbances in different systems (skeletal, ocular, cardiovascular, etc.). A common feature of the heritable disorders of the connective tissue is joint hypermobility (JH), which is a highly heritable condition characterized by an increased range of motion of the joints as a consequence of connective tissue involvement.

We encountered a 7-year-old boy addressed by teachers due to school problems. His mother suffer from MFS such as his maternal grandmother who died by cardiac complications. Considering familial antecedents, his morphotype (long bone overgrowth), JH and ocular problems, genetic testing for diagnostic purposes is planned. No history of abnormalities in pregnancy and in the early years was reported. The first problems appear around age 5. These include concentration problems, impulsivity, hyperactivity, opposition to follow instructions given by teachers and difficulties to read and write. His mother also had graphomotor difficulties. The psychometric assessment reveals a normal-range intellectual performance. Hyperactive, inattentive and impulsive behaviors were confirmed in clinical evaluation, and although this symptomatology not met criteria for Attention Deficit/Hyperactivity Disorder (ADHD), these symptoms are problematic and merit attention.

The link between connective tissue problems and anxiety disorders has been widely documented (Bulbena et al. 2011). Though less known, the association with attention deficit and hyperactivity has been pointed out by several clinicians and researchers in the last years. Hofman et al. (1988) reported a high frequency of neuropsychological deficits (50 %) among children with MFS ($n = 30$), of whom 17 % had attention deficit disorder with or without hyperactivity and 13 % learning disabilities. Besides, these authors highlighted that hand-wrist hypermobility might explain difficulties involve in writing and others performance tasks (object assembling, coding, etc.). In this sense, Kirby and Davies (2006) stressed the importance to take into account the presence of JH in therapy indication: "repetitive practice may not improve performance for children with this presentation, but instead could cause pain and further stiffness" (p. 517). Furthermore, Lannoo et al. (1996) reported that MFS patients have a poorer performance than controls in tests measuring sustained visual attention and visuoconstruction. These authors underline that these differences are not explained by visual problems linked to MFS. The pediatrician MJ Harris (1998) observed in 200 children with attention deficit disorder and ADHD that the great majority (99 %) had hypermobile joints mainly in the fingers and elbows. This author speculates

C. Baeza-Velasco (✉) · M. Soussana · A. Baghdadli
Department of Child and Adolescent Psychiatry,
CHU Montpellier, 39 Avenue Charles Flahaut,
34295 Montpellier Cedex 05, France
e-mail: carolina.baeza-velasco@parisdescartes.fr

C. Baeza-Velasco
Institut de Psychologie, Université Paris Descartes,
Sorbonne Paris Cité, Paris, France

A. Baghdadli
Laboratory Epsylon (EA 4556), University of Montpellier,
Montpellier, France

about a genetic link between both conditions (ADHD/hypermobility). A similar finding is reported by Hollertz (2012) who described based on his clinical experience with more than 500 patients a high co-occurrence of EDS and ADHD. According to Hollertz, these patients often require orthopedic cares and rehabilitation because of pain and instability. In a case report, Baker et al. (2001) associated connective tissue laxity and attention deficit disorder. Recently, Koldas Dogan et al. (2011) and Shiari et al. (2013) found a significantly higher prevalence of JH in children with ADHD compared to controls (31.5 vs. 13.9 and 74.4 vs. 12.8 %, respectively).

Child psychiatry professionals should be more aware of the link between connective tissue problems and neurodevelopmental disorders. Due to the highly heritable nature of collagen problems, family anamnesis is recommended. The hypermobility of joints when accompanied by other physical symptoms (mainly painful symptoms because of fragility of tissue) may alert to the presence of a heritable disorder of the connective tissue (Hakim et al. 2010) thus a referral to the geneticist and a musculoskeletal assessment may be required. Considering the cumulative evidence of the link between JH and anxiety disorders, an exploration of comorbid pathological anxiety is also suggested. More research is needed in order to elucidate etiological links and improve knowledge concerning this group of patients to tailor interventions considering its particularities.

Conflict of interest The authors declare no conflicts of interest.

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