Hypoplastic splenium of the corpus callosum and co-occurrence of attention deficit/hyperactivity and language disorders: a case report

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Dear Editor,

There is some evidence of an association between attention deficit/hyperactivity disorder (ADHD) and structural abnormalities in the brain. For instance, changes in the splenium of the corpus callosum (SCC) have been reported recurrently in studies using magnetic resonance imaging (MRI) and functional imaging, suggesting a possible relationship with ADHD. Despite their high incidence, language disorders are often unrecognized, probably because they generally co-occur with other psychiatric disorders, with ADHD representing one of the most common co-morbid conditions. This association suggests a possible etiologic correlation between these disorders. Here we report a case of a child with a hypoplastic SCC and secondary ADHD symptoms associated with language disorder.

Case report: H, an eight-year-old boy, had been followed for two years due to “agitation” and language disabilities. The agitation involved distractibility, inability to focus, and school complaints about his restless and troubled behavior, which suggested the presence of ADHD. His language impairment was severe, with only a few spoken words and difficulty in comprehending sentences. Clinical examination revealed epicanthus, bulbous nose, syndactyly of second/third/fourth right toes and second/third left fingers. He had been to a geneticist, and a karyotype (G-banding) test was performed revealing a mosaicism (47 XY, +mar /46 XY), with no abnormalities observed in his parents. An electroencephalogram showed non-specific alterations and the MRI revealed a hypoplasia of the SCC (Figure 1). He had been a premature (eight-month) baby of a 46-year-old mother, and had developed complications as a newborn (pneumonia followed by cardiac arrest).

His behavioral and cognitive development was marked by a delay in walking and speech. There was no significant psychiatric family history. The genetic assessment was nonconclusive, leaving us with the diagnoses of ADHD and receptive-expressive language disorder, based on DSM-IV-TR criteria. He had been treated with periciazine followed by sulpiride, with poor response. After our evaluation, we started him on methylphenidate, 0.5 mg/kg/day, with satisfactory control of the hyperactivity without improvements in communication.

Figure 1 MRI scan showing circumscribed hypoplasia of the splenium portion of the corpus callosum.
Some case reports have already described total/partial agenesis of the corpus callosum associated with ADHD. Although these reports describe cases with co-morbid conditions, to our knowledge this is the first report on the association of ADHD, SCC hipoplasia, and a well defined mixed language disorder. With this type of language disorder, a higher risk for psychiatric comorbidity is observed, particularly ADHD that is present in 30-60% of such patients.

Imaging studies are providing evidence of involvement of structural brain abnormalities in the etiology of ADHD; brain regions implicated include the SCC, cerebellum, basal ganglia, frontal and temporal cortices, and the cingulate gyrus. Due to the role it plays in transferring language information through the inter-hemispheric connection of fibers of the temporal and occipital lobes, the SCC could represent a structural link between language disorders and ADHD.

This case report provides further support for structural alterations in the brain in ADHD. The corpus callosum is important as an area of inter-hemisphere connection, and its structural changes may be linked not only to psychiatric disorders but to various neurodevelopmental disabilities, such as communication disorders.

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* Modest
** Significant
*** Significant: Amounts given to the author’s institution or to a colleague for research in which the author has participation, not directly to the author.

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References