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RESEARCH ARTICLE

EARLY-ONSET SCHIZOPHRENIA AND AGENESIS OF THE CORPUS CALLOSUM: A CASE REPORT AND LITERATURE REVIEW

H.Ballyout, S.Karroumi, O.Bounsir, M.Berghalout, Z.Ennaciri, F.Z.El Fahiri, I.Adali and F.Manoudi

1. Mental Health Research Team, Ibn Nafis psychiatric Hospital, Mohammed VI University Hospital Marrakech, Morocco .

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Abstract

This article presents a clinical case of a 17-year-old adolescent with early-onset schizophrenia associated with partial agenesis of the corpus callosum. We discuss the rarity of this association and its importance in the evaluation of neurodevelopmental disorders. We also highlight the diagnostic and therapeutic challenges encountered in this context. Through a review of recent literature, we examine the links between agenesis of the corpus callosum and schizophrenia and explore the neurobiological perspectives of this association.

Introduction:-

Agenesis of the corpus callosum (ACC) is a rare brain malformation characterized by the complete or partial absence of this crucial structure that connects the two cerebral hemispheres. Its prevalence is estimated between 1.4 and 2.5 per 10,000 live births, with a male predominance. ACC can be isolated or associated with other brain and extracerebral malformations. Clinical manifestations include cognitive deficits, motor disorders, epilepsy, language disorders, as well as neuropsychiatric symptoms such as hallucinations, delusions, and symptoms associated with attention-deficit hyperactivity disorder (ADHD) [2].

Early-onset schizophrenia (EOS), defined by the onset of symptoms before the age of 18, is a rarer form of schizophrenia, affecting about 0.03% of the general population and accounting for 20% of schizophrenia cases. It is characterized by a more severe onset of symptoms, often associated with early cognitive and psychosocial deterioration. Recent neuroimaging studies, particularly brain MRI, have revealed structural abnormalities, including a reduction in the volume of the corpus callosum, associated with altered interhemispheric connectivity. These observations support the hypothesis that ACC may play a role in the onset and progression of schizophrenic symptoms [4], [6].

The association between ACC and schizophrenia remains poorly documented, although a few case studies have been reported. This relationship raises questions about the underlying neurodevelopmental mechanisms and the impact of ACC on the pathophysiology of schizophrenia.

OBJECTIVE OF THE CLINICAL CASE

Through the clinical observation of an adolescent patient suffering from early-onset schizophrenia and partial agenesis of the corpus callosum, this work aims to evaluate the relationship between these two conditions and explore the neuropsychiatric implications of this co-occurrence.

MATERIALS AND METHODS :

We present the case of a 17-year-old adolescent, orphaned, who was not schooled and had a difficult childhood marked by sexual abuse and family maltreatment. He was treated at the Mohammed VI University Psychiatric Hospital in Marrakech. A literature review was conducted through PubMed and ScienceDirect databases using the keywords "early-onset schizophrenia" and "agenesis of the corpus callosum."

CLINICAL OBSERVATION

The 17-year-old patient, orphaned and having had a difficult childhood, has a history of drug use since early childhood. He had never been followed in psychiatry and was referred for behavioral issues, including aggression toward other children at the orphanage, marked social isolation, and incoherent speech with a fixed facial expression. He also presented persecutory delusions toward the other children, associated with auditory and visual hallucinations. A moderate intellectual deficit was observed, but no sensory deficits or epileptic seizures were noted.
Brain MRI revealed partial agenesis of the corpus callosum, affecting the splenium. Medication management with risperidone (1 mg per day) was initiated, leading to a significant improvement in symptoms after 20 days: reduction in hetero-aggressiveness, delusional thoughts, and disappearance of hallucinations.

DISCUSSION:

Agenesis of the corpus callosum (ACC) is frequently observed in schizophrenia cases, although this abnormality is not specific to this disorder. Recent studies have shown that reduced corpus callosum size is associated with altered connectivity between the cerebral hemispheres, a key factor in the pathophysiology of psychotic disorders. A 2023 study on schizophrenia revealed that schizophrenic patients exhibit a significant reduction in corpus callosum size, with specific implications for the negative symptoms of schizophrenia, particularly in the early psychotic episodes [4].
Early-onset schizophrenia presents specific developmental and neuroanatomical features that distinguish it from late-onset schizophrenia. Studying corpus callosum abnormalities in this population could shed light on the underlying neurodevelopmental mechanisms of schizophrenia. Although data on the long-term evolution of these patients remains limited, it has been shown that patients with agenesis of the corpus callosum often present disrupted interhemispheric connectivity, which may predispose them to psychotic disorders [2], [5].
Research also suggests that the absence of the corpus callosum, by disrupting interhemispheric regulation, may promote the cognitive and behavioral disorganization observed in schizophrenia, especially when this abnormality is present from the earliest stages of development. This clinical case confirms that ACC may play a crucial role in the early manifestation of schizophrenic symptoms, although longitudinal studies are necessary to better understand this association.

Additionally, previous research results show that agenesis of the corpus callosum is associated with a variety of neuropsychiatric manifestations, ranging from dyslexia to more severe disorders such as schizophrenia. Hynd et al. (1995) observed that corpus callosum dysfunctions could be linked to learning disorders such as dyslexia, due to the disruption of communication between the cerebral hemispheres, which can affect the ability to process information in an integrated manner [4].
In another context, a study by Hallak et al. (2007) documented a case of childhood-onset schizophrenia associated with complete agenesis of the corpus callosum. This clinical observation helped to better understand the impact of this brain abnormality on the onset of severe psychotic symptoms from the early years of life, suggesting an early neurodevelopmental influence [6].
More recent research, such as that by Popoola et al. (2019), has also highlighted that ACC, even partial, is frequently associated with neuropsychiatric symptoms such as hallucinations and delusions. These findings underscore the importance of early management of these patients, as identifying structural brain abnormalities may be crucial for more appropriate and effective treatment [3].
Recent research on corpus callosum abnormalities, including studies by Swayze et al. (1990) and Johnson et al. (2013), has shown that schizophrenic patients often present reductions in corpus callosum size, but this reduction is not always correlated with specific psychotic symptoms. This suggests that there is heterogeneity in the presentation of these abnormalities and that other factors, such as genetics and environment, may also play a role in the onset and progression of schizophrenia [5], [7].

CONCLUSION:

This clinical case underscores the importance of a thorough neurodevelopmental evaluation in patients presenting with schizophrenic symptoms, particularly those with structural brain abnormalities. Agenesis of the corpus callosum, though rare, may constitute an important predisposing factor in the development of schizophrenia, especially when present from the onset of adolescence. Future studies should further explore the association between ACC and schizophrenia to better understand the underlying neurobiological mechanisms and adapt therapeutic approaches.

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