

POST-STREPTOCOCCAL NEUROPSYCHIATRIC DISORDER.

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Abstract: Post-streptococcal neuropsychiatric disorders refer to a group of conditions characterized by the sudden onset of neuropsychiatric symptoms following a streptococcal infection. These disorders are most commonly observed in children and adolescents and are believed to be associated with an abnormal immune response that affects the central nervous system. Clinical manifestations may include obsessive-compulsive behaviors, motor or vocal tics, anxiety, emotional instability, and cognitive difficulties. Early diagnosis and appropriate management are crucial to reduce symptom severity and improve long-term outcomes. This annotation reviews the possible pathophysiological mechanisms, clinical features, and the importance of timely intervention in post-streptococcal neuropsychiatric disorders.

Keywords: Post-streptococcal infection; Neuropsychiatric disorders; PANDAS; Autoimmune response; Pediatric neurology.

Introduction

Post-streptococcal neuropsychiatric disorders represent a significant and emerging area of interest in pediatric neurology and psychiatry. These conditions occur following infection with Group A beta-hemolytic streptococcus and are characterized by the acute onset of neuropsychiatric symptoms. The most well-known form of this condition is Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections (PANDAS). The underlying mechanism is thought to involve an autoimmune response in which antibodies produced against streptococcal antigens mistakenly target components of the brain, particularly the basal ganglia.

Children affected by post-streptococcal neuropsychiatric disorders often present with symptoms such as obsessive-compulsive disorder, motor and vocal tics, anxiety, mood changes, and behavioral disturbances. These symptoms may develop suddenly and can significantly impact academic performance, social functioning, and quality of life. Despite growing recognition of this condition, challenges remain in diagnosis due to overlapping symptoms with other neuropsychiatric disorders.

Understanding the pathogenesis, clinical presentation, and diagnostic criteria of post-streptococcal neuropsychiatric disorders is essential for early identification and effective management. Increased awareness among healthcare professionals can lead to timely treatment, reduce long-term complications, and improve patient outcomes.

In recent years, increasing attention has been directed toward the role of infectious agents in triggering neuropsychiatric conditions. Streptococcal infections, which are common in childhood, have been implicated as potential environmental triggers that may lead to immune-mediated

neurological and psychiatric symptoms in susceptible individuals. Genetic predisposition, immune system dysregulation, and repeated exposure to streptococcal antigens are considered important contributing factors in the development of post-streptococcal neuropsychiatric disorders.

The diagnosis of these disorders is primarily clinical and relies on a combination of symptom presentation, history of recent streptococcal infection, and exclusion of other neurological or psychiatric conditions. Laboratory findings, such as elevated antistreptolysin O (ASO) titers, may support the diagnosis but are not definitive on their own. Due to the heterogeneity of symptoms and the lack of universally accepted diagnostic biomarkers, post-streptococcal neuropsychiatric disorders remain a subject of ongoing debate and research within the medical community.

Management strategies typically involve a multidisciplinary approach, including antibiotic therapy to address the underlying infection, immunomodulatory treatments in selected cases, and psychiatric interventions to manage behavioral and emotional symptoms. Early recognition and comprehensive treatment plans are essential to prevent symptom progression and reduce the risk of chronic neuropsychiatric impairment.

This introduction sets the foundation for a detailed discussion of the etiology, pathophysiology, clinical manifestations, diagnostic challenges, and therapeutic approaches related to post-streptococcal neuropsychiatric disorders.

Main Body

Post-streptococcal neuropsychiatric disorders develop as a result of an abnormal immune response following infection with Group A beta-hemolytic streptococcus. Instead of fully resolving after the infection, the immune system may continue to produce antibodies that cross-react with neuronal tissues due to molecular mimicry. This autoimmune mechanism is believed to primarily affect the basal ganglia, a brain region involved in motor control, behavior regulation, and emotional processing. As a consequence, affected individuals experience sudden and significant neuropsychiatric symptoms that differ from typical gradual-onset psychiatric conditions.

The most commonly described subtype of post-streptococcal neuropsychiatric disorders is Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections (PANDAS). This condition predominantly affects children between the ages of 3 and puberty, coinciding with the peak incidence of streptococcal infections. The clinical course is often characterized by an abrupt onset or dramatic exacerbation of obsessive-compulsive symptoms and motor or vocal tics. In addition to these core features, patients may present with anxiety, irritability, emotional lability, sleep disturbances, attention deficits, and a decline in academic performance.

The pathophysiology of post-streptococcal neuropsychiatric disorders remains an area of active research. Immunological studies suggest that antineuronal antibodies and inflammatory processes may disrupt normal neurotransmitter signaling within the central nervous system. Neuroimaging findings in some patients have demonstrated changes in basal ganglia volume or activity, further supporting the hypothesis of immune-mediated neurological involvement. However, the variability of findings indicates that multiple biological mechanisms may contribute to disease development.

Diagnosis of post-streptococcal neuropsychiatric disorders is challenging due to the absence of a single definitive diagnostic test. Clinicians rely on a detailed medical history, including evidence of recent streptococcal infection, sudden symptom onset, and a relapsing-remitting course associated with infections. Laboratory tests such as throat cultures and elevated antistreptolysin O or anti-DNase B titers may provide supportive evidence but are not sufficient for diagnosis in isolation. Differential diagnosis is essential to exclude other neurological, infectious, or primary psychiatric disorders with similar clinical presentations.

Treatment approaches are individualized and often require collaboration between pediatricians, neurologists, psychiatrists, and immunologists. Antibiotic therapy is used to eradicate active streptococcal infection and may help reduce symptom exacerbations. In moderate to severe cases, immunomodulatory treatments such as corticosteroids or intravenous immunoglobulin have been explored, although their use remains controversial and is typically reserved for selected patients. Behavioral therapy and appropriate psychiatric medications play a crucial role in managing obsessive-compulsive symptoms, anxiety, and emotional disturbances, helping patients and families cope with the functional impact of the disorder.

Long-term outcomes of post-streptococcal neuropsychiatric disorders vary widely. Some children experience complete symptom resolution with appropriate treatment, while others may have recurrent episodes associated with subsequent infections. Early diagnosis, prompt treatment, and continuous follow-up are key factors in improving prognosis and minimizing long-term neuropsychiatric complications. Ongoing research is essential to better understand disease mechanisms, establish standardized diagnostic criteria, and develop evidence-based treatment guidelines. In addition to the clinical and immunological aspects, psychosocial factors play an important role in the course of post-streptococcal neuropsychiatric disorders. Sudden behavioral changes can be distressing not only for affected children but also for their families, leading to increased stress, misunderstanding, and social difficulties. Children may experience problems with peer relationships, reduced self-esteem, and school avoidance due to the abrupt onset of symptoms. Therefore, family education and psychological support are essential components of comprehensive care.

Preventive strategies have also been discussed in relation to post-streptococcal neuropsychiatric disorders. Prompt diagnosis and adequate treatment of streptococcal infections may help reduce the risk of neuropsychiatric complications. In selected cases with recurrent infections, prophylactic antibiotics have been considered; however, their long-term benefits and risks remain a topic of debate. Continued monitoring of immune and neuropsychiatric status is important to detect relapses early and adjust treatment accordingly.

Overall, post-streptococcal neuropsychiatric disorders represent a complex interaction between infection, immune response, and brain function. A better understanding of these interactions will contribute to improved diagnostic accuracy and more effective therapeutic strategies in the future.

Conclusion

Post-streptococcal neuropsychiatric disorders constitute a significant and complex clinical condition that highlights the close relationship between infectious diseases, immune responses, and neuropsychiatric functioning. These disorders primarily affect children and are characterized by the sudden onset of behavioral and neurological symptoms following streptococcal infection. Although the exact pathophysiological mechanisms are not yet fully understood, growing evidence supports the role of autoimmune processes and basal ganglia involvement.

Early recognition and accurate diagnosis are essential for effective management and improved outcomes. A multidisciplinary approach that combines medical, immunological, and psychiatric interventions offers the best opportunity to reduce symptom severity and prevent long-term complications. In addition, increased awareness among healthcare professionals and families can facilitate timely treatment and appropriate follow-up.

Further research is necessary to establish standardized diagnostic criteria, identify reliable biomarkers, and develop evidence-based treatment guidelines. Advancing knowledge in this field will not only improve patient care but also contribute to a broader understanding of immune-mediated neuropsychiatric disorders.

In conclusion, post-streptococcal neuropsychiatric disorders should be considered an important differential diagnosis in children presenting with an abrupt onset of obsessive-compulsive symptoms, tics, or behavioral changes. Timely identification of the underlying streptococcal trigger and appropriate therapeutic intervention may significantly alter the disease course and reduce the burden on patients and their families. Emphasis should also be placed on long-term monitoring, as recurrent infections can lead to symptom relapses and prolonged neuropsychiatric impairment.

A holistic and patient-centered approach, incorporating medical treatment, psychological support, and family involvement, is essential for optimizing clinical outcomes. Continued interdisciplinary collaboration and ongoing scientific investigation will play a crucial role in clarifying unresolved aspects of these disorders and improving future preventive and therapeutic strategies.

Moreover, recognizing post-streptococcal neuropsychiatric disorders as a distinct clinical entity can help reduce misdiagnosis and unnecessary delays in treatment. Improved diagnostic awareness may prevent these patients from being incorrectly classified as having primary psychiatric disorders, thereby ensuring that underlying immunological and infectious factors are appropriately addressed. This is particularly important in pediatric populations, where early intervention can positively influence neurodevelopmental trajectories.

Finally, educating parents, teachers, and caregivers about the potential neuropsychiatric consequences of streptococcal infections is crucial. Such awareness can promote early medical consultation, adherence to treatment plans, and supportive environments for affected children. Through continued research, education, and clinical vigilance, the long-term impact of post-streptococcal neuropsychiatric disorders can be minimized, ultimately improving the quality of life for patients and their families.

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