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Physical Therapy Implications of Zika and Microcephaly in Latin America

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Introduction

The purpose of this project is to describe the history and etiology of the Zika virus in Guatemala, demonstrate the relationship of gestational Zika infection to increased incidence of microcephaly, and describe clinical manifestations and useful physical therapy treatments of microcephaly. This project includes a review of literature and case studies from Guatemala.

Zika and Microcephaly in Latin America

The first confirmed cases of Zika in Guatemala were at the end of 2015 with rates fluctuating until the end of 2016 when rates decreased and plateaued. Guatemala reported rates of Zika infection in the Zacapa region at 106 per 100,000 people in 2016, making it an area of interest for further discussion due to strongly suspected sequelae of Zika infection which includes microcephaly and Guillain-Barre Syndrome. Exact rates of Zika infection are difficult to quantify due to poor understanding of virus etiology, methods of testing, lack of healthcare resources, and mildness of symptoms; underreporting is strongly suspected. The suspected relationship between gestational Zika infection and microcephaly is substantial and is corroborated by multiple studies. One such study found that the number of microcephaly cases peaked after a lag of 30 - 33 weeks from the peak in acute exanematous illness attributed to Zika. It is believed that the timing of this lag is due to infection of pregnant mothers during the first trimester. The timing of Zika infection during gestation may impact the clinical presentation of the child, with infection during the 3rd trimester less detrimental than infection during the 1st trimester.

Case Study Overview

During 03/11/18 - 03/16/18 in the Zacapa region of Guatemala, three children with microcephaly were seen for a single visit each. Each child was evaluated and treated by at least one of the authors and a licensed physical therapist. Treatments were individualized to the needs of the child and included the following: passive range of motion, stretching, tone reduction techniques, and sensory stimulation. Medical confirmation of gestational Zika infection was not possible due to the nature of Zika testing, medical resources in the region and study design.

Case I

Age, Gender: 18mo, M  
Location: Esquipulas, Chiquimula, Guatemala  
Symptom Presentation: High flexor and extensor tone  
Underdeveloped  
No speech - Lack of eye contact - suspected cortical blindness  
Grasp deficit  
Lack of voluntary anti-gravity movement  
PT Interventions:  
• Tone reduction techniques including trunk rotation  
• Postural control practice for sitting balance and head control  
• B AFOs to reduce risk of PF contracture

Case II

Age, Gender: 18mo, F  
Location: Gualan, Zacapa, Guatemala  
Symptom Presentation:  
• High flexor and extensor tone  
• Underdeveloped  
• No speech - limited vocalizations  
• Increased extensor tone  
• No signs of blindness or vision deficits  
PT Interventions:  
• PROM  
• Tone reduction techniques  
• Passing head through midline  
• Encouragement of reaching

Case III

Age, Gender: 13yo, M  
Location: Zacapa, Zacapa, Guatemala  
Symptom Presentation:  
• High flexor and extensor tone  
• Underdeveloped  
• No speech - limited vocalizations  
• R hip dislocation  
• Left limited vocalizations  
• Reduced head control - difficulty moving head across midline  
• Lack of voluntary anti-gravity movement  
• Irritability  
• “Windswept” legs  
• Asymmetrical rib cage  
• Scoliosis  
• Contractures  
• Suspected vision deficits  
PT Interventions:  
• PROM and stretching for contractures  
• Tone reduction techniques  
• Auditory stimulation via musical toys  
Researcher Comments:  
Age places gestational infection prior to primary Zika outbreak; however it is strongly suspected that Zika had been circulating the region for years. Clinical presentation is similar to other confirmed cases.

PT Implications

Infants with microcephaly should be evaluated and treated by a multidisciplinary team. PT evaluation and treatment of microcephaly should be based on the biopsychosocial model including activity, participation and environmental factors.

Evaluation: Early evaluation and intervention, within the first 6 months of infancy, leads to better outcomes for babies with microcephaly due to high brain plasticity in infancy. In-home assessment improves the evaluation due to objective view of environmental factors. Standardized testing of infants head circumference below the 3rd percentile, without consideration for symptomatic presentation, is essential to ensure that infants with mild motor delay are treated. When symptoms are present, children should be evaluated and treated regardless of head circumference. Physical therapists in regions affected by Zika should screen at-risk children for developmental delays.  

Presentation: There is a link between degree of microcephaly and physical disability. Children with microcephaly may present with spasticity, hyperreflexia, contractures, poor motor control, decreased antigravity movement, decreased ambulation, irritability, tremors, low height and weight, and dysphagia. Other problems include seizures and visual and auditory deficits. Irritability may be due to pain and is often treated with medication.

Intervention: Focus interventions on functional mobility to improve ease of receipt of care. Decrease tone through trunk rotation and rhythmic rotation of limbs. Reduce risk of contracture with orthoses, stretching and gentle mobilizations. Improve motor control, especially head control with progressively decreasing support in sitting. Provide caregiver education on tone reduction, contracture management and strengthening, as well as ADL training. Refer to speech therapy for feeding strategies to improve weight and nutrition.

Research needed: Due to the recent increase in Zika virus infection rates and the lack of literature on treatment of infants exposed in utero, there is a need for future research on early screening and effective PT interventions.